NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices

/year December 11, 1974 Vol. VIII, No. 50

Crime Watch

LSD Deal Uncovers Inventory Rip-Off Scheme

By Edith Holmes
Of the CW Staff

ELGIN, Ill. – While working undercover on a drug case, agents with the Illinois Bureau of Investigation (IBI) discovered that the manipulation of an automated inventory system at a wholesale distributing company here had led to the theft of some $20,000 worth of merchandise.

IBI agent Herbert Andreen said he had just purchased some LSD from the head shipping clerk at Eby-Brown Co., when the clerk began boasting about "ripping the company off" of televisions, stereos and other goods over the past year.

"At first I didn't really believe him," Andreen said. "But when he offered to sell me a color TV in addition to the drugs, I decided he wasn't kidding."

Further investigation led to a night-time computer operator who manipulated the inventory system while working alone at the firm, according to Andreen.

Using a variety of techniques, the operator allegedly erased and substituted invoice numbers as the company's IBM 1130 executed an accounts receivable program.

"By hitting the interrupt-request or program stop buttons before an invoice had been totaled, he apparently erased certain invoice numbers, substituting other figures that would reflect a credit of sale for merchandise that had been stolen," the agent explained.

Duplicate Invoices

Following the head clerk's boast, IBI alerted executives at Eby-Brown, and they began monitoring the output produced during the night shift, Andreen

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Requires State-Level Certification

SCDP Proposes Legislation to Regulate DP Profession

By Patrick Ward
Of the CW Staff

HUDSON, Mass. – The Society of Certified Data Processors (SCDP) has sent state legislatures a sample draft of legislation that would declare data processing "a learned profession to be practiced and regulated as such."

The proposed legislation would set up state boards of registration to rule on who could "practice data processing" or call themselves "data processors" or "computer professionals" or related titles. Violations could lead to fines of $100 to $500 or up to three months in jail.

The legislation would also require a DP shop, whether in a service bureau or a large corporation, to have a registered "professional data processor" on its staff or to have its operation approved by one.

This data processor would have the "leverage" to withhold approval of unacceptable applications or systems, according to Kenniston W. Lord Jr., SCDP president.

Lord said the main impact of this legislation would be on the level of DP management, since it would push firms to train DP administrators who could be certified.

While a person could bill himself as a DP consultant, he could not work for pay unless registered as a professional data processor, he said.

"This should weed out some of the charlatans," he added.

But Lord said certification would not hinder newcomers who want DP careers, as its opponents have charged.

Instead, junior programmers and other "paraprofessional" personnel would be unaffected if they worked in a shop where there was at least one certified staff member to inspect their applications or where an outside data processor would come in to vouch for their work.

Junior staff members could also work under the designation "data processor in training," Lord noted.

While the draft is intended as a model for state DP licensing laws and is not expected to be enacted as presently written, Lord reported it has already received sponsorship in the Massachusetts legislature.

In addition, the National Council of Commissioners on State Laws, the Council of State Governments and the Organization for Economic Cooperation and Development (OECD) have expressed interest in the draft.

Paths to Certification

Under the proposed legislation, a state licensing board would require that a person applying for certification have either:

- Graduated from an approved four-year school or college in DP and completed three or more years of active practice in DP work, "attested to and certified by a data processor who currently holds state registration and license, and of a character deemed suitable and/or satisfactory by the board, indicating that the applicant is competent to be placed in responsible charge of such work, to be determined by interview and oral examination by the board;" or
- Successfully passed "written and/or oral examinations designed to show knowledge and skill approximating that attained through graduation from a four-year DP course" and completed at least five years of "active practice in data processing work of a character deemed suitable and/or satisfactory to the board and indicating that the applicant is competent to be placed in responsible charge of such work."

A third path to certification is available five years after the state's registration act

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U.S. COM Use Could Save $1 Million/Year: GAO

By Vic Farmer
Of the CW Staff

WASHINGTON, D.C. – Users may be able to save millions of dollars a year in their computer output costs by taking advantage of the experiences and recommendations incorporated in a recent government study.

The General Accounting Office (GAO) estimated that conversion to computer-output-microfilm (COM) at just eight federal agencies could provide an annual savings in DP expenditures of $1 million.

In its recent report to Congress, the GAO summarized its study of existing government COM installations and reported federal organizations already using COM have obtained such benefits as lower cost, faster information output, more versatile output formats and easier handling and distribution of reports.

One Department of Defense activity the GAO visited in its research on COM has saved nearly $218,000 over three years when it was able to eliminate a computer previously used solely for running printers.

The study of eight potential users of COM revealed 1.2 million pages of an estimated 3.9 million pages of reports produced monthly could be converted to microfilm at an estimated annual savings of $1 million.

One such potential user is the Defense Supply Agency (DSA), which the GAO found could produce its computer output on microfilm for about one-fourth the cost of printing the data on paper.

In addition, installations producing 500,000 pages of paper printouts each month, according to GAO, may be able to reduce report producing costs by as much as 50% with the use of COM.

Comparison of production costs for 5,000 pages between printouts and COM revealed material costs for printouts were $44 compared with $8 for COM. And labor costs savings were even more significant at $150 for printouts compared with $12.50 for COM, GAO said.

Moreover, with costs of paper and labor

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Neb. Banks Plan Statewide Net To Share Terminals in Stores

By Don Leavitt
Of the CW Staff

CHICAGO – Commercial banks in Nebraska are developing plans for a statewide network of interconnected and shared electronic banking devices in banks and out in stores and other retail locations.

The Nebraska Electronic Transfer System (Nets) is intended to compete directly with the "challenge of the Hinky Dinky" supermarket operations stated earlier this year by First Federal Savings and Loan Association of Lincoln, Neb. [CW, Feb. 13].

First Federal shook the banking world last January by installing IBM 2730 terminals at two Hinky Dinky markets. Although run by supermarket employees, these card-activated units were linked to First Federal's computer and allowed both deposits and withdrawals from the customer's savings and loan (S&L) account.

Commercial bankers went to court to question the legality of the operation, but the challenges were rebuffed by both the Federal Home Loan Bank Board – which regulates S&Ls – and the U.S. Department of Justice.

Nets will go further than First Federal. If present plans hold, it will provide

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On the Inside This Week

IBM Trial Date Set

NEW YORK – Even though all parties agree there are still many loose ends, the trial of the government's antitrust suit against IBM will begin Feb. 18, Judge David Edelstein ordered last week.

Among the loose ends, the parties are still wrangling over certain government documents IBM wants, but which the government has refused to deliver, and over an IBM claim that the government has enlarged the case since it was first filed.

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Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except: a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160.

50 cents a copy; $12 a year in the U.S.; $20 a year for Canada and PUAS; all other foreign, $36 a year. Four weeks notice required for change of address.

Computerworld can be purchased on 35mm microfilm in half-volumes (six-month periods) through University Microfilm, Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700.

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Conflict of Interest?

GAO Investigating FPC Contract Award

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The General Accounting Office (GAO) is investigating allegations that members of the oil and gas industry may be able to access confidential regulatory information through an on-line computer system that soon will be operational at the Federal Power Commission (FPC).

The contract for the $10 million system was awarded in July to Planning Research Corp. (PRC) of Los Angeles, a company whose subsidiary, Foster Associates, represents petroleum interests in Washington.

The GAO investigation was initiated by Rep. John E. Moss (D-Calif.), who believes the contract may constitute a conflict of interest. Moss asked Comptroller General Elmer B. Staats to investigate the possibility that the computer system could be used to funnel "instant" confidential FPC files to the petroleum industry.

Information the FPC routinely handles incudes data on availability of natural gas, locations of closed-in wells and applications for rate hikes, for example.

Rate decisions made by the FPC have far-reaching ramifications, hitting consumers in their pocketbooks through increases in gas and electric bills and affecting profits and losses for public utilities and the petroleum industry.

"While the request for procurement was handled fair and square," according to a Washington consultant familiar with the contract, "with a competitive bid filed by at least one other company, Optimum Systems, Inc., PRC had the advantage of having performed an earlier facilities management study for the FPC," and was "the incumbent."

"The incumbent always has the advantage," he said.

The contract calls for PRC, whose Maclean, Va., branch office is responsible for fulfilling the contract, to install and operate on a facilities management basis a fully automated, on-line regulatory information system computer facility at the FPC headquarters.

An IBM 370/158 system with terminals and related equipment utilizing a data base management system are the essential elements in the system.

According to an FPC spokesperson, the system is expected to "increase the effectiveness" of the FPC's program "to regulate interstate electric power and natural gas industries and will assist in resolving general energy policy problems shared with other agencies.

"It will help the FPC develop and explore alternatives to regulatory decisions, evaluate the impact of decisions and evaluate national and regional energy development and trends," she said.

Federal COM Use Could Save $1 Million/Year

(Continued from Page 1)

continuing to rise, GAO predicted savings from COM use should be even greater in the near future.

User Resistance

But GAO did cite some problems with COM conversion. User resistance is often met because "people used to reading and marking paper reports are reluctant to change their methods and accept COM reports. However, a good training program can help them overcome this reluctance," GAO said.

GAO also reported that many people prefer COM reports when they become familiar with them.

Most people are unaware of COM's advantages and potential for improving information systems, GAO continued. And when systems are developed the designers usually rely on paper reports without even considering microfilm alternatives.

GAO objected to some feasibility studies of COM that only compare paper and film costs. Evaluation of proposed microfilm systems should include all film processing, duplicating and inspection requirements and should insure that all direct and indirect costs are included in a comprehensive costing of alternatives, GAO advised.

But more importantly, the nature of the information system and the effect of changing to COM should be reviewed.

As an example of indirect cost savings, GAO cited the Social Security Administration's earnings report file. This file contains records for over 200 million people and would require 300,000 sq ft to store on paper compared with 7,000 sq ft on microfilm. The Social Security Administration estimates its COM system costs about one-fourth of a paper system.

Faster information retrieval is another often overlooked benefit GAO found. In a study of a supply control system at the Naval Supply Center, Charleston, S.C., where COM is used for stock status reports and other inventory reports, "only 800 man-hours are now needed to retrieve stock status information, compared with about 2,500 man-hours when paper was used."

GAO added that generally between two and 15 minutes is required to locate information in paper reports compared with 30 seconds to locate information on microfilm.

Although GAO found significant savings with COM, it does not advocate across the board conversion to COM, with each agency procuring its own system.

The Naval Air Station, Norfolk, Va., for example, installed COM equipment in May 1972. The unit was tailored to fit the station's needs and existing DP equipment without considering whether other agencies had a need for such services, GAO said. Consequently, the station only uses the COM equipment about 4.3% of its capacity.

However, GAO does endorse the establishment of service centers for smaller government agencies.

Neb. Banks Plan Statewide Net

(Continued from Page 1)

electronic deposit/withdrawal access to any commercial bank in the state from any of the terminal units, according to Russell C. Browne, vice-president of Omaha National Bank.

Speaking at an American Bankers Association conference here last week, Browne said sharing terminals "is perhaps uniquely a function of the number of commercial banks in the state, their geographical dispersion and available capital."

In any case, he added, a "broadly dispersed terminal system, activated by proprietary [magnetic stripe] transaction cards, is absolutely essential to the cost-effective delivery of financial services" in Nebraska.

Services offered by the banks could be competitive even while their use of the hardware is cooperative, Browne noted.

Browne also said Nets would impose no limit on the type of terminal device installed, nor any limit on where they might be placed. He sees the use of manned IBM 2730s, unmanned automated teller units, AT&T's Transaction Telephones, NCR terminals or Docutel cash dispensers being selected by the installing bank according to its own criteria.

In addition, Nets might well include an automated clearinghouse to handle direct credits and preauthorized debits and a broad range of "internally automated services" designed for the consumer, Browne forecast.

Interfaces with electronic cash register point-of-sale systems with Montgomery Ward, Sears Roebuck and J.C. Penney stores are also being explored, he added.

Nets was launched by the Nebraska Bankers Association in June with a feasibility study. Phase II, preliminary systems design and standards definition activities to allow effective sharing of the terminals, is now being run by William Esping of First Data Resources of Omaha. No date for completion of this phase has been released.

Over State Lines?

The system will probably be implemented in the Omaha and Lincoln areas first, then gradually expand to cover the state. Discussions with the banking association in Iowa may lead to expansion over state lines as well, Browne said.

In its early stages, Nets will probably utilize minicomputers to tie the terminals together and to link them with the appropriate processing centers.

As it grows in size, the switching mechanism will have to become more complex and Browne expects that aspect of the project to be operated by a third-party profit-motivated vendor selected as a result of competitive bidding.

DP Certification Law Proposed

(Continued from Page 1)

becomes effective. This option allows the licensing board to certify a person with a 12-year record of DP work "deemed suitable and/or satisfactory to the board and indicating that the applicant is qualified to design, operate or to supervise development of data processing work and has had responsible charge of important data processing work for at least five years . . . "

The draft also provides a two-year grace period to allow working DPers "to obtain the proper academic qualifications, certifications, evaluations . . . as required by the act."

'In-Training' Certification

"Data processor in training" certification requires graduation from a four-year DP curriculum and passing the certification programs of the Institute for Certification of Computer Professionals (ICCP) or a high school education and record of four or more years experience in DP work.

In the latter case, the applicant must also pass "an examination provided by the board in the fundamentals of data processing."

The draft stated that the "board is willing to accept such examinations as are available in academic environments or under the aegis of the [ICCP], provided the board is given the opportunity to review and approve such examinations."

In place of, or in addition to these examinations, the licensing board may prescribe written and/or oral examinations.

The draft leaves room for exceptions, such as permitting a nonresident of the state to do DP work for 60 days. Qualified scientists doing research work in the physical or natural sciences are also exempt.

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While executing your program against the test files generated by TDG, you can execute the MetaCOBOL Run-Time Debugging Aid (RDA), which also uses simple directives embedded in the source code. The RDA produces an Unexecuted Paragraph Summary, which will VERIFY the completeness of your testing.

Apart from its usefulness in verifying testing completeness, the RDA is also a powerful tool in the Verification phase for auditing a program prior to installation. The detailed reports verify that the program is performing as predicted internally, as well as producing correct output.

Where a system involves multiple programs interacting or processing common data, the Cross-Program Auditor module of AUTOFLOW II reports in detail on common data and variables. All variables which are significant across program boundaries are automatically analyzed from the source code, with any inconsistencies or other problems brought into immediate focus.

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The Verification phase is marked by a high level of job activity. Testing individual programs and linkages between programs generates a lot of work for the computer. To ensure that Verification is not hampered by poor turnaround, use ROSCOE's conventional RJE to get those jobs in and out of the machine room FAST.

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Afips Approves Opening of Washington Office in '75

By Nancy French
Of the CW Staff

SAN DIEGO – The board of directors of the American Federation of Information Processing Societies (Afips) has approved the opening of a Washington office to help bridge the gap between data processing experts and policymakers in the federal bureaucracy and Congress.

Up for a vote at a board meeting last spring, the proposal to open the Washington office was tabled for further study by a special Washington activities study group headed by Dr. Frank Ryan, director of information systems for the U.S. House of Representatives. The study group's work was completed this fall.

In a meeting here recently the board appropriated funds for 30 months' operation, and the office is expected to be open shortly after the first of the year.

The office will not be a Washington lobby, according to Thomas White, Afips' director of communications, since lobbying would be a violation of Afips' status as a tax-exempt nonprofit scientific and educational organization.

Information Service

Instead, it will function as an "objective and impartial" information service to Afips' constituent societies, make experts available to members of the executive agencies and Congressional staffs and provide information directly to these groups.

"Information" was defined by the board of directors as "technical information which may be used in arriving at policies by such agencies, but not policy guidance per se."

The board also established a standing committee on Washington activities to recommend policy for the Washington office, ensure that approved policies are carried out and monitor the office's effectiveness, especially in the early years of operation, Afips said.

Keith W. Uncapher, director of the Institute for Information Sciences at the University of Southern California and former Afips president, will chair the committee.

Specific services constituent societies could expect from the Washington office would include monitoring government and commercial publications, attendance at government hearings and some type of newsletter.

Further, constituent societies could expect Afips to become more visible at the federal level of government through the Washington office's personal and informal contact with members of executive agencies and congressional staffs.

Committee Recommendations

In approving the Washington office, the board acted on the recommendations of Ryan's Washington activities study group.

A charter drawn up by the study group will serve as a general guideline until the Afips board votes formal approval at its May meeting in Anaheim, Calif.

The charter recommended that the Washington office serve Afips' constituent societies and the discipline of information processing broadly "without duplicating or interfering with" their activities.

In that regard, the charter suggests that each constituent society appoint a liaison to the Washington office. In addition, the charter emphasizes that neither the volunteer committee nor paid employees of the Washington office represent themselves as Afips spokesmen.

"Only when specifically authorized by the board or the president" should such people speak for Afips or take action which might be interpreted as a reflection of Afips policy, the committee said.

Relations Defined

The charter also spells out the relationship between the Washington office and three existing groups – the board of directors and president, Afips' headquarters staff and Uncapher's Washington activities committee.

According to the charter, the board of directors will "establish policy and approve the budget for the Washington office in the same way as other Afips activities.

"However, because the Washington office will, from time to time, require high-level Afips involvement with activities such as congressional testimony and meetings with senior government officials, it is anticipated that the Afips president will normally have a closer, more personal, more continuous relationship with the Washington office than with most other Afips activities," the charter said.

Organizationally, the Washington office will report to the executive director as does the Afips press staff and the public information staff, for example.

As for the voluntary Washington activities committee, the charter recommends that it take an active role in:

- Recommending policy to the board of directors, executive committee and president and ensuring that the policies of the board of directors are carried out.
- Advising the executive committee and executive director on hiring the senior staff member for the office.

DPMA, IIA Voted In

SAN DIEGO – The American Federation of Information Processing Societies (Afips) has approved the applications of the Data Processing Management Association (DPMA) and the Institute of Internal Auditors (IIA) as member and affiliate, respectively.

With its approximately 28,000 members, the DPMA becomes the second largest constituent society in Afips, second only to the Association for Computing Machinery (ACM).

DPMA now joins ACM, the Institute for Electrical and Electronics Engineers Computer Society, the Society for Computer Simulation and Afips as partners in sponsoring the National Computer Conference (NCC) under a new NCC agreement effective Jan. 1.

Diet Program Aids Diabetics

WACO, Texas – Diabetics now have a computer program to help solve their special diet problems.

Since diabetic foods are expensive and often exclude favorite dishes, health specialists at Baylor College of Medicine here have programmed a computer to print grocery shopping lists which fit the medical, economic and food preference needs of diabetics.

Because a diabetic is more likely to stay on a diet he enjoys and can afford, the computer is given information on various ethnic and American dishes, current grocery prices and personal data.

Time Pressure Besets Committee Meeting to Meld Privacy Bills

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – With adjournment scarcely two weeks away, committee staff members from both the House of Representatives and the Senate are working feverishly to resolve differences between the two privacy bills passed recently [CW, Dec. 4].

More than 100 differences divide supporters of the Senate's Ervin Bill, S. 3418, and the House's Moorhead Bill, H.R. 16373, which has the endorsement of the President. Of that number, four differences are very serious and may defy compromise.

At this late date, Congressional strategists have abandoned the idea of bringing senators and representatives to conference. Instead, staffers will attempt to eliminate differences at the staff level, develop "conforming amendments" and bring a single bill up for a vote in each house.

If passed, the bill would then go to the President for his signature.

The four sticky issues are:

- A privacy commission to implement the legislation, included by the Senate but defeated by the House.
- The Senate's inclusion of the private sector through a ban on the sale of mailings lists, restrictions on use of the Social Security number and the inclusion of all federal contractors.
- The Senate's inclusion of criminal justice files.
- The Senate's requirement that agencies obtain permission from individuals on file before any personal information may be transferred from one agency to another – a procedure required even for issuing a Social Security check. The House, in contrast, viewed "routine use" as acceptable provided it be reported annually in the Federal Register.

Since other bills are being considered to cover privacy needs in the area of criminal records, and additional bills can be proposed next year to cover the private sector, some proponents of the Senate bill say they can live with the House bill as a starter.

LSD Deal Uncovers Inventory Rip-Off

(Continued from Page 1)

continued. By studying these printouts, agents found a pair of duplicate invoice numbers – one for a $7.80 box of candy bars, the other for some $2,000 worth of television sets, he reported.

The scheme also involved manipulation of the firm's "war-path book." Standing for "weight average report," the war-path book contains information on what is on order and year-sold-to-date and week-sold-to-date data.

Andreen noted the operator allegedly lowered the quantity numbers on some of the items received in order to select the goods to be stolen. He said this technique was used less often because it involved many more potential checks by Eby-Brown, and thus a much higher risk of discovery.

A third portion of the scheme consisted of zeroing out the inventory on items misplaced just prior to shipping, Andreen said. But manipulation of the "red line list" of misplaced goods did not involve the company's computer system, he added.

Eby-Brown admitted it had been lax in maintaining strict control over inventory, the IBI agent reported. However, the company asserted it had never been looking for such a scheme and that the amounts stolen were not large enough to create suspicion.

The wholesale distributor hopes to guard against violation of inventory in the future by increasing the storage capacity in its system so that the serial numbers for all products can be recorded. Andreen also indicated the company plans to go to a General Automation Model 18/30 with disk, rather than tape.

Arrested in the case and charged with grand theft are David M. Scarbrough, head shipping clerk for Eby-Brown, Davis S. Schwab, the firm's computer operator, and Michael Perkins who worked on the company's loading platform. Scarbrough is also charged with delivery of hallucinatory drugs, and all three are currently awaiting trial, according to Andreen.

Describing himself as "a street agent who rarely hobnobs with white collar crime," Andreen remarked he was impressed by the intelligence of Schwab in his alleged manipulation of the computer program. He noted the 20-year-old had had no more than on-the-job training.

Real-Time Net Aids Discovery of Subatomic Particles

By Dr. Martin Breidenbach
Special to Computerworld

MENLO PARK, Calif. – Physicists from the Stanford Linear Accelerator Center (Slac) and Lawrence Berkeley Laboratory (LBL) have used a locally developed computer network in the discovery of two new subatomic particles.

With the aid of a real-time link from the research site to Slac's central computing facility, researchers announced the discovery of a new particle called psi 3105 on Nov. 10. Less than two weeks later, on Nov. 21, Slac and LBL physicists announced a second particle, psi 3695, with properties similar to the first.

Because much research is done on the accelerator, individual experimenters have a limited time in which to use the equipment and must be able to react quickly to unexpected results in order to modify their approach. The link to the computer network gave these physicists the ability to modify their first experiment which in turn contributed to the discovery of the second particle in such a short period of time.

The researchers used the Stanford Positron Electron Asymmetric Rings (Spear), a colliding beam storage ring facility made up of giant electromagnets. Spear includes mass energies ranging from 2,600 million electron volts (MeV) to above 8,000 MeV.

Spear is controlled by a real-time network consisting of a dedicated Xerox Data Systems Sigma 5 linked through an IBM System/7 and sensor-based control units to the central computer facility.

The central facility includes two IBM 370/168s and an IBM 360/91 (triplex system) running as a single system. Total main storage is 8M bytes.

The Sigma 5 runs a time-sharing foreground/background type of operating system that not only controls the experimental apparatus but also collects the experimental data, logs the data to tape and sends it to the triplex system for immediate analysis. Results are written back to the experimenter at the Spear site on terminals.

Before the link, physicists used the Sigma 5 to verify that the experimental apparatus was functioning properly and to spool the data to tape for later analysis on the central computer. Although some analysis was done during the course of an experiment, full data analysis was not completed until weeks or even months after the experiment was finished.

With the link it is possible to get immediate feedback in order to verify results, adjust the equipment or modify the experiment.

Discovery of the first particle, psi 3105, began in June when scientists found a deviation in their data which was thought at first to be a statistical deviation.

Toward the end of October, physicists going over the data decided this inconsistency was not statistical and started to investigate.

This next experiment consisted of varying the energy of Spear and measuring the resulting cross-sections in units called nanobarns. Cross-sections are a measure of area which indicate the probability of the beam particles interacting to produce another set of particles.

Instead of stepping the energy by the usual increment of 200 MeV, they did a binary search using steps of about 1 MeV in the region of the suspected particle and discovered the particle at 3,105 MeV.

After the particle was discovered and it was found to exist over such a narrow energy interval that it was almost missed, both the experiment and the equipment were changed to scan systematically in 2 MeV increments.

Thus began a purposeful search which led to the discovery of the second particle at 3,695 MeV. As each minutes-long step was taken, the physics results were reported back to the experimenter via the real-time link.

Competition Hot On Campus CPU

PRINCETON, N.J. – Many computer science and engineering undergraduates, attracted to Princeton University by a "big name" faculty, are finding themselves low on the totem pole where access to the computer is concerned.

Students, whose work at the university's computer center produces no revenue, must compete for time with faculty members doing government-funded research as well as with the university administration, which needs the facility for payroll and general housekeeping functions.

This year the university committed $900,000 from the general fund to finance computer use by students, and administrators expect that sum to double by 1977.

The priorities committee and several other university bodies are "exploring ways of reversing – or at least halting – this alarming trend," according to Provost Francis S. Hackney.

If the computer center had greater capacity, the center operation could be self-supporting. Charges made to separate university accounts such as the Plasma Physics Laboratory for computing done in connection with government-funded research, for example, could provide enough income to pay the center's entire operating budget.

But lately the five-year-old IBM 360/91 system has been operating near capacity and paying customers must be turned away.

In deciding when and how – and even if – the center should be upgraded, the administration is asking itself "what should our general direction and philosophy be on computing at Princeton," according to James F. Poage, director of the computer center.

"It's not an issue of money," Poage explained. "The primary purpose of this university is research, not education, and a research institute has to have certain facilities available for faculty, and this includes computing."

The decision the administration makes may seriously affect the type of education Princeton will be able to provide in engineering and computer science. One critic explained that Princeton already can't match the type of student experience many of its freshmen engineering students have had on the high school level.

Among the options under consideration are:

- A centralized facility in which the present IBM 360/91 would be augmented by a new IBM system.
- A decentralized facility with a smaller computer to serve students, a central batch facility for research and a third for administration.
- Forgoing immediate upgrading but taking pressure off the existing facility by buying time-sharing services for students.

TV Data Bank Under Attack

Special to Computerworld

BRISTOL, England – A computer data bank listing virtually every household in Britain has come under attack as an invasion of privacy.

The issue arose when people without TV sets in their homes began receiving computer-printed letters demanding to know why they did not have a TV license. (The British Broadcasting Corporation [BBC] is subsidized by the fees from mandatory TV licenses – $17/yr for a black and white set, $29/hr for color.)

The center of the dispute is the National TV License Records Office here, which began computerizing its records two years ago. Previously, records were kept on manual files in regional offices, and so far only half are on the computer, an ICL 470.

Frank Langfield, general manager of the licensing organization, explained that records have always been kept on an address basis rather than a name basis, and thus it was easier to build up a file of all known addresses. This was done based on voting records and information about new housing developments from local authorities.

With the aid of the computer, Langfield said, it has become easier to produce lists of people who do not have TV licenses, and thus check for evaders. It is estimated that 17.5 million households have TV licenses, about 1 million have no TV and about 650,000 have TVs but no license.

It is these evaders, who cost the BBC $13 million/yr, that the records office is trying to catch. And Langfield said that the computer-issued letters are a highly cost-effective way to do it.

Even if a person writes back to say that he has no TV, there is a one-in-four chance that he will be randomly selected for a visit by an inspector, Langfield explained, because "a high percentage of people" lie to the records office. People without a TV are not required either to answer the letter or talk to the inspector.

UK White Paper Due This Month, May Disappoint Privacy Backers

By Joseph Hanlon

Special to Computerworld

LONDON – A special white paper on computers and privacy will be published before Christmas, according to Lord Harris, minister of state for the Home Office, and some people have already been warned that it may be disappointing.

The government has decided to separate the issue of computers and privacy from the rest of the privacy question, which will be the subject of a different white paper next year.

This has been done because "the possible abuse of personal information held on computers," Harris said, is the one aspect of the privacy question "which has, perhaps, caused more concern than any."

Insiders concerned about computerized invasion of privacy have already been warned that they will be disappointed by the white paper.

One knowledgeable source said that while virtually all other highly computerized countries have seen the need for some sort of data bank legislation "the white paper will say, in effect, that Britain is so wonderful that no such legislation is needed here."

This view corresponds with the one offered by previous studies here which said there was no evidence of invasions of privacy with respect to data banks.

But privacy advocates, such as the National Council for Civil Liberties, criticized this view and said the researchers simply waited for maintainers of data banks to come forward (none did) instead of going out and looking, as was done in the U.S.

Look at Police Computer

In his speech announcing the white paper, Harris took special note of the national police computer, which began operation April 1. (At the moment, it is similar to the FBI's National Crime Information Center, containing information only on wanted or missing people and vehicles; next year, however, arrest records and all motor vehicle registrations will be added.)

Harris said that "inevitably there are some anxieties about the general question of the possible misuse of personal information held on computers, be it by the police or by other government departments. The police are highly sensitive to this, I know, and considerable steps have been taken by the police service to make quite sure that unauthorized hands cannot get access to the kind of information held on the police computer."

But the white paper is unlikely to outline the "considerable steps," which are thought by some to be inadequate. For example, there will apparently be no record of the individual who actually uses a terminal, so there will be no way of tracing a policeman who fraudulently obtains data.

Citizens Group Calls For Data Regulation

CAMBRIDGE, Mass. – A prestigious citizens group has called for a fair information practices code and federal regulations to control the indiscriminate collection and use of personal data on American citizens.

The recommendations, part of a report on "Privacy in a Free Society," published by the Roscoe Pound-American Trial Lawyers Foundation's 1974 Annual Chief Justice Earl Warren Conference on Advocacy, were adopted after a two-day conference on privacy here.

More than 50 participants, including noted journalists, lawyers, law professors, computer scientists, law enforcement officials, industry spokesmen, political scientists, judges, philosphers and U.S. congressmen, discussed the growing dangers to civil liberties posed by such activities.

On dossiers and collection of personal information, the group voted almost unanimously to adopt a recommendation stating that the data collector should:

- Owe every data subject a legally recognized fiduciary duty of reasonable care and fair dealing.
- Collect only information which is demonstrably necessary and relevant to a proper purpose of the organization.
- Provide adequate measures for data security, including technical, administrative and personnel safeguards.
- Provide every data subject the right to access his own file and provide procedures for challenging and correcting erroneous or irrelevant information.
- Destroy or seal all obsolete information.

Project Control Should Include Training in System Utilization

By Edith Holmes
Of the CW Staff

SAN DIEGO – While full project management systems (PMS) correctly emphasize project control through planning, they rarely provide the training in policies and procedures necessary to implement such control, Clayton Harrell of Xerox Information Services cautioned users here recently.

"Companies interested in putting in a full PMS package to oversee every project must be willing to take the time to explain to their personnel how the system works," he said. Even with these explanations, such systems require a minimum of two years to install from ground zero, and the failure rate is very high, according to Harrell.

"Too many PMS installations represent attempts to kill flees with shotguns," he warned. Evaluating some 50 project management systems over the last year, Harrell noted these systems "only apply in relatively large operations where many people are working on several projects at once."

Automating aspects of project management, Pert packages and project accounting systems provide the middle ground between full and manual PMS, he said.

Harrell praised Pert and Pert-related management packages for their "good planning and sound performance calculation capabilities."

While they are "good cost collectors," project accounting systems "don't go beyond strong budget management to provide overall project standards and networking," he commented.

For the smaller company wishing to design its own system, the life cycle procedures and progress reporting of a manual system probably offer the greatest adaptability, Harrell suggested.

But regardless of the type of plan, he asserted no project management system can be successfully implemented through management dictates alone. "The system must be conducive to the overall working environment and to the needs of the people who will use it to control their individual projects," he said.

He urged companies "to establish requirements which are realistic and then to set a system that marries the requirements of the system to your needs.

"Remember, too, that the system you install must have a definable payback," he stressed. "A project management package must be as cost-justifiable as any other in-house system."

To these ends, Harrell recommended that companies document the needs of their environments and that they take a look at the documentation of the PMS package under consideration before purchasing it.

In addition, he described a need for technical software support in order to put PMS into the data center. "Be sure to have any customized changes in the package tested and collect data on the system by using a base case," he said.

"Work out an agreement with your vendor in which you can pilot the system and in which errors are suspended and data validation is understood," Harrell added. "Without support from your vendors, you won't have a system."

He also emphasized the importance of keeping the user of the company's PMS involved through invoices, progress reports and trouble and delay reports.

Finally, Harrell noted the significance of the project manager's role as the interface between his project and the project management system. "Project managers can use PMS as a planning tool, a control mechanism and a performance evaluator," he commented. "But they must first be able to plan, direct and communicate the needs and goals of their projects to all who need to know them."

NBS Report Summarizes Privacy Proposals

WASHINGTON, D.C. – Many recent suggestions for safeguarding the privacy of individuals in computer-based recordkeeping systems are contained in the proceedings of a National Bureau of Standards (NBS) meeting recently published by the Department of Commerce.

Including proposals made by legislators, managers, industrialists and technologists who took part in the conference on privacy and security in computer systems held last spring, the report encompasses recommendations to:

- Enact cohesive privacy legislation at the national, state and local levels of government.
- Stimulate research and development of technological safeguards in the private sector by providing legislative policies, standards and security requirements.
- Develop and apply an effective balance of managerial, administrative and technological measures in safeguarding data confidentiality.
- Determine costs of data confidentiality as a basis for decision and allocation among those who must bear the expense.
- Enlarge the educational activities needed to improve understanding of the privacy, data confidentiality and computer security issues.

In addition, the report covers the remarks made by speakers at the conference, the second of two sponsored by the NBS to highlight the problems which governmental managers face in protecting confidential data and the actions needed to provide effective safeguards against the misuse of such data.

Titled "Approaches to Privacy and Security in Computer Systems" (NBS Special Publication 404), the report can be obtained from the Superintendent of Documents, Washington, D.C. 20402 for $1.20.

Aussies May Import DPers

Special to Computerworld

CANBERRA, Australia – The Federal Government here is considering proposals to include computer professionals among the preferred type of immigrants under the restricted immigration intake.

Although the government has limited immigration because of rising unemployment and a worsening economic situation, the computing industry and the increasing imports of DP equipment is considered one of the bright spots in the Australian economy.

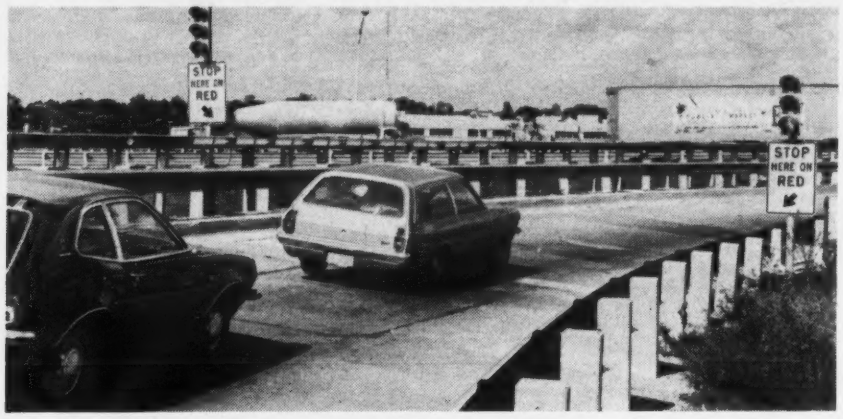
One computer staffing group in Sydney recently reported it has 110 unfilled job orders, including 19 systems analysts, 19 analyst/programmers, 32 programmers, 12 custom engineers and 14 salesmen.

Further information can be obtained from the Australian Embassy in Washington, D.C.

Traffic System Used Less by Those Who Need It Most

TAMPA, Fla. – A system designed to safely guide motorists from an entrance ramp into speeding expressway traffic seems to get more use from confident, able drivers than from the more hesitant drivers who need it most.

That was the observation of Joe Zambito, traffic analyst for the city of Tampa, where the Federal Highway Administration (FHWA) and the Florida Department of Administration are testing the system at an entrance ramp to Interstate 275.



Motorists waiting to enter expressway traffic pace themselves to the speed of the green band along the guardrail on the left.

The $300,000 system uses sensors buried in the right-hand lane of the highway to feed data on oncoming cars to a 16K Raytheon 704 minicomputer at the city's nearby computer center. Along what normally would be the guardrail on the left-hand side of the entrance ramp is a row of fluorescent lights.

Finds Gaps

The computer system is programmed to find gaps in the oncoming highway traffic and, when it does, to turn on a number of the green fluorescent lights sequentially, giving the appearance of a moving band.

Signs tell motorists to keep pace with the band, which is designed to lead them into an opening in the expressway traffic at a safe speed.

But not everyone follows the green band: "I've seen people come up, a perfectly good band comes by and they just continue at their own slowpoke speed," Zambito observed.

Drivers who probably would have no problem entering the traffic flow without the help of the device seem to use it most, he said. Those who appear to use it least seem to be "people who are a little bit afraid of driving on the expressway.

"To them this is just something else to worry about," he said.

They probably don't understand the concept or what it means and tend to just ignore it, he said.

Three Modes

The green band system has three modes of operation, each based on traffic flow on the highway. In light traffic, when gaps are frequent, motorists can drive onto the ramp to pick up a green band on the run without stopping.

When traffic is heavier and gaps less frequent, the system is programmed to stop drivers on their approach to the ramp with a conventional traffic signal. When the system recognizes a safe gap, the traffic signal turns green and an accelerating green band guides the driver onto the freeway.

If traffic is so heavy that the computer system can't find acceptable gaps within a set period, it goes to a stopgap mode that meters cars onto the ramp from which they must find a spot in traffic for themselves.

One-Year Evaluation

The green band system is based on Raytheon systems research. The University of Florida and the state's department of transportation are now giving the system a one-year evaluation that will end next August.

The study will try to determine whether the system is a cost-effective alternative to rebuilding or closing freeway ramps where poor sight distance or short acceleration lanes make merging difficult, the FHWA noted.

In heavily built-up urban areas, where reconstruction would be costly, the FWHA said computer-controlled systems may be a reasonable alternative in terms of cost as well as safety.

'Computer Bandit' Told to Make Good Phone Company Theft

By Marvin Smalheiser
CW West Coast Bureau

LOS ANGELES – A "computer bandit" who later became a security consultant has been ordered to start paying back the Pacific Telephone Co. for equipment he stole from it.

Judge Ernest J. Zack recently ordered Jerry Neal Schneider, 23, to pay the utility $141.50/mo for five years, making total restitution $8,490.

The judge had placed the total value of the stolen property at $214,649, and other estimates valued the worth of the equipment from $65,000 to as much as $1 million.

Broke the Code

Schneider, who is now a consultant to firms seeking to protect themselves from theft by computer, was arrested in February 1972 and charged with stealing equipment that was later resold by his firm [CW, Feb. 16, 1972].

Investigators said Schneider broke the code to the telephone company's computerized ordering system and used a Touch-Tone phone to place large orders.

The orders were delivered to docking areas throughout Los Angeles County between midnight and 2 a.m. Schneider was able to pick up the equipment before telephone company employees reported for work.

Schneider pleaded no contest to a grand theft charge and served 60 days. He was subsequently placed on probabtion.

Editorials

DP Deserves More...

Many companies are apparently taking a short-sighted attitude toward their data processing departments as they face economic uncertainty in the year ahead.

As in the past it appears that DP budgets will be severely constricted during the tight money times that many expect lie before us, a cutback which may turn out to be a mistake on hindsight.

Instead of restricting DP spending in such times, computer-using companies should take a hard look at computer-based applications that can reduce operating costs in other areas.

For example, in a time of shortages, inventory and supply management and prediction become increasingly important, and properly designed computer systems could reap large benefits in this area.

Another example might be reduced clerical costs through the use of more efficient data entry, acquisition or collection – an item that could be particularly important as clerical salaries rise more rapidly than does productivity.

Well-thought-out systems to aid in the manufacturing process can also help boost the productivity of many companies even in times of increasing costs on all fronts.

And let's face it, productivity is the name of the game.

Only through increased productivity of the American worker and American industry will the nation be able to get back on the course of steady and stable economic growth.

All else – wage, price and profit controls, jawboning or Ford administration "do-littlism" – will have little more than psychological effect if productivity of industry continues to lag while wage and material costs rise.

Well-planned, well-designed, economic computer applications can play a large role in helping industry provide the needed productivity increases.

...But Has to Prove It

While many companies are taking the narrow approach to DP budgets now that they are faced with runaway costs, some of the blame must rest with the management of the DP department.

In the past computer applications have often been oversold, so the finished product delivered far less – if anything – than was promised while costing far more than planned.

Too often, DP people also failed in their comprehension of what was really needed by the business organization in which they found themselves, and therefore delivered solutions to problems that did not really exist.

So now top management, faced with growing pressures on its resources, finds it easy to limit the DP budget and to postpone any suggested projects.

However, these tight economic times could prove a blessing to the DP manager who knows the business environment and who can suggest *realistic, timely, economic* ways to use computer equipment in the fight against rising costs.

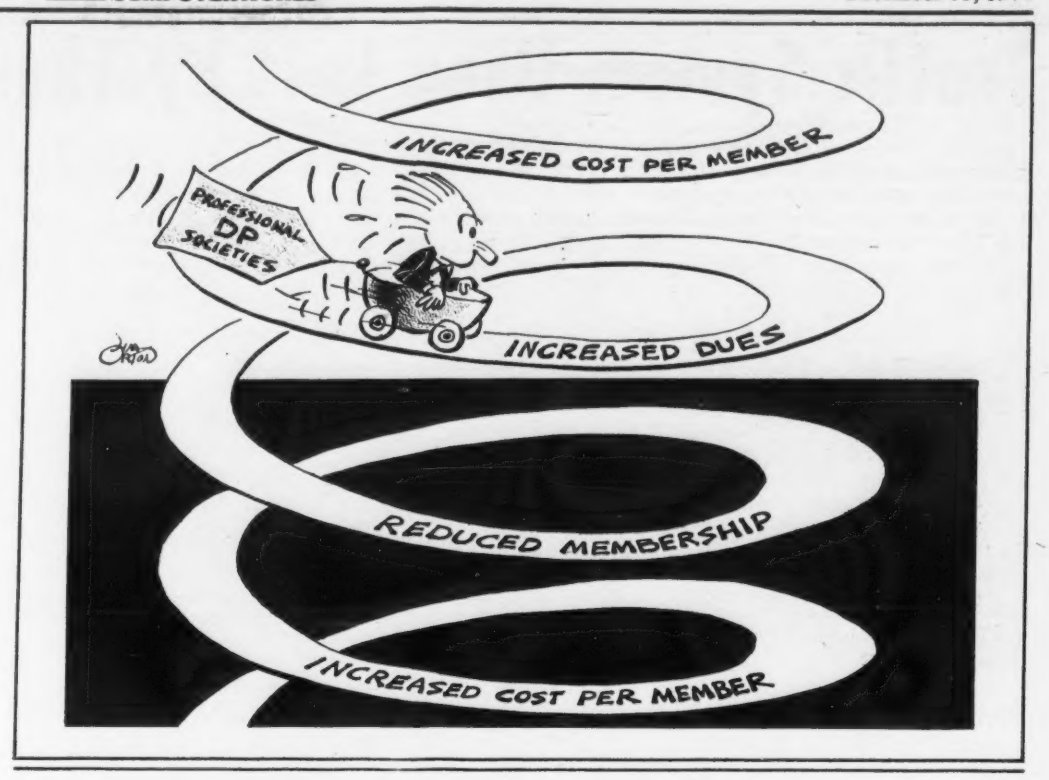
Management is definitely looking for ways to get better control over all expenses and DP can play a major role.

But managers will have to cost justify any new applications and will have to prove concretely that their projections are realistic and workable.

It is not time for pie-in-the-sky promises, but rather for solid, well-thought-out application suggestions.

The DP managers who can provide these solutions to top management may well find their careers enhanced, along with the whole image of the data processing function within the organization.

"You should hammer your iron when it is glowing hot." – Maxim 262, Publilius Syrus (circa 42 B.C.)



Letters to the Editor

Privacy Statement Designed To Identify Positive Measures

In the first article of his two-part series "Plain Talk on Privacy" Daniel Schneider asserted that the Domestic Council Committee on the Right of Privacy had developed the idea of a privacy impact statement. "What they are in fact asking for" said Schneider "is a catalog of all the possible damages that an employee, customer, credit seeker, etc. might suffer as a result of the normal operation of the proposed system, plus all of the possible damages that might flow from such unplanned events as negligent or malicious use of system data."

Not true. As chairman of the Privacy Committee Task Force concerned with this matter, I would like to set the record straight.

First of all, it should be understood that the Cabinet Committee has concerned itself thus far primarily with protection of privacy rights in the operation of Federal Government data banks. The preparation and filing of privacy plans or statements has been considered only in this context.

Second, rather than attempting to trace the possible negative impact of an information system on the individual, we have emphasized the development of a document setting forth the positive steps to protect privacy which have been incorporated in plans for design and operation of any federal information system handling personal data.

In the early stages we called this a privacy impact statement, but last July it was recognized that this title could cause the kind of confusion evident in Schneider's article. At that time, the term was changed to privacy safeguards plan.

The purpose of having agencies prepare and file such plans would be: (1) to provide a means for agency heads to assure that the protection of personal privacy is thoroughly considered in the design and implementation of each information system within the agency and (2) to provide the public visibility and an opportunity to comment on the manner in which general laws and policies relating to privacy protection have been implemented for each particular system of records.

Charles C. Joyce Jr.
Assistant Director
Office of Telecommunications Policy
Executive Office of the President
Washington, D.C.

It's Not as Easy for Grocers

Regarding the editorial "If Retailers Can Do It": I am happy to see the National Retail Merchants Association (NRMA) working to adopt standards for marking department store merchandise. However, the unfavorable comparison with Universal Product Code (UPC) is completely unwarranted and obviously based on a lot of ignorance.

The average retail price of items sold in department stores is at least 10 times the average of items sold in grocery stores. The unit cost of price marking, therefore, is a much more important consideration in grocery stores.

In other words, the added two cents for the price marking on a $10 shirt or blouse (various estimates range from one to five cents) is relatively insignificant. The same two cents would be so significant that no one would consider spending that much to mark a can of peas.

Nothing about the UPC precludes price marking if the customer wants it (and is willing to pay for it).

The American market economy is a beautiful thing to watch. Someone will be first to eliminate price marking. He will watch results carefully as will his competitor across the street. If the customers feel that price marking is important, they will start shopping across the street and the bold leader will put prices back on his merchandise to get his customers back.

If, on the other hand, the customers continue their normal shopping pattern, the first grocer will then add up his labor savings, reduce some prices (or perhaps refrain from raising them) and advertise, "Our prices are lower." The second grocer will then eliminate price marking and get his prices into line.

A.W. Holtsberry
Manager
Systems and Data Processing
Big Bear Stores & Hart's Stores
Columbus, Ohio

IRS Accepts Disks, Too

The Oct. 30 article "Mag Tape Filings Extended by IRS" should have included the fact that IRS also accepts information documents filed on magnetic disks. We are capable of processing virtually any tape or disk filed. However, authorization to file either must be granted by the IRS service center presently processing your paper documents.

More money saving benefits are available to the magnetic tape disk filer than just paper savings. For more information, write or telephone your local IRS service center magnetic tape coordinator.

Richard M. Rheinlander
Magnetic Tape Coordinator
Austin Service Center
Austin, Texas

Confirming the Relationship

Bruce C. Libby of the Department of Public Welfare, State of Minnesota, was correct in pointing out [CW, Oct. 30] the percentage of data encompassed by one, two and three standard deviations (SD) on either side of the mean value in a normal distribution.

Libby was incorrect in stating that I've been misinterpreting our Lockheed data ["Report Gets Measures' Meaning Across," CW, Oct. 16]. The fact is that my presentation at the Boole & Babbage Users Group meeting in Montreal contained a slide which correctly depicted the relationship Libby pointed out.

David Schumacher
Lockheed Missiles & Space Co., Inc.
Sunnyvale, Calif.

Crises in Cobol

"Defend me from my friends; I can defend myself from my enemies," said a wise soldier. And so it is with Cobol, the world's most frequently used, somewhat-machine-independent computer language. Time after time, through the dozen years of heavy use, its proponents, its developers, have hurt it far more than detractors like me.

Not the original supporters, of course – not the Brombergs and the Wegsteins and the Phillipses and the Hoppers. They really meant to create and promote a business language that would permit the transferring of programs from one machine family to another, that would facilitate explication and instruction, that would let users concentrate on the application rather than the hardware.

It was a painful parturition. "What rough beast, its hour come round at last/Slouches toward Washington to be born?" says the poet, approximately. But born it was and thousands of installations use nothing else.

The horrid attempts to "improve" the standard began immediately. In a column called "Get Lost, Codasyl!" [CW, Aug. 15, 1973] I denounced the pattern and called on users to purchase nonchanging, nonimproved compilers, "without seductive novelties."

In the Forum paper of the current *Datamation*, two vigorous letters give the sad story of current attempts to mess up the definitions and functions of the present American National Standard (ANS) language.

I personnally participated, as a user-concerned professional, as vice-president of ACM, and as the former director of the federal DP standards effort, in a conference at the National Bureau of Standards (NBS) asked for by the Computer and Business Equipment Manufacturers Association (Cbema): another attempt to weaken the federal application of the Cobol standard.

Some years ago, while I still ran the NBS shop, I stood in an auditorium there before representatives of 52 hardware and software manufacturers, government user departments and a few deeply involved commercial users. I asked their recommendation on a federal procurement policy that would not only require the presence of all ANS Cobol language elements in purchased or free-with-the-hardware compilers, but that would *exclude* all additional or novel elements. This was the famous "floor equals ceiling" approach. The vote was 50 to 2 against! I think Ford and U.S. Steel supported me – not one government department or one supplier.

The other day, "ceiling" having long since vanished, the big boys attempted to perforate the floor. They (IBM, Honeywell, CDC, Univac and so on – almost no small outfits) want the General Services Administration (GSA) to permit procurement of "slightly" substandard compilers, subject to a one-year fix-up promise. That is, a Cobol package that did not pass the Navy validation test as administered and interpreted by NBS would still be salable. What a ripoff!

I got up on my high horse and told them frankly, "If you can't meet the spec, don't bid; the Feds don't need any one of you that badly!" And, of course, if a government agency really *has* to have certain hardware (for instance, to expand an existing installation begun before the Cobol standard was mandatory), the agency head can waive the GSA procurement anyhow.

It's as obvious as supplier greed that what Cbema wants to do is weaken the whole DP standards effort. And remember, Cbema is the *sponsor* of X3: provides the secretariat and schedules the meetings and writes up the minutes and arranges international matters.

And throws the wooden shoes into the gears! How shameless can you get?

Herb Grosch

Beyond Plug-to-Plug Standard

Forgotten Memories Can Solve User Interface Problems

The Taylor Report
By
Alan Taylor, CDP

The traditional way users envision a computer is to think of a central processor and a memory. The processor without the memory is no good, nor is the memory without the processor.

Yet together they make a terrifically powerful combination. Indeed, between them they started the computer revolution. (Peripherals only came later!)

The original function of the processor was handling mathematical and logical problems by following the instructions loaded into the memory. It was, and is, essentially a human thought processor equipped with techniques to interpret the human problem type of instructions.

In those beginning days the processor also had a few nonhuman instructions to handle the peripherals. They were few because, at that time, peripherals were restricted and were simple in operation. Reading, for instance, was often handled only in fixed-length blocks.

The peripherals themselves were wired into the system, and the timings for each individual computer were set to match the peripherals that were physically present, rather than having both peripheral and computer matched to a particular set of standards.

Now the peripheral situation has changed. There are many alternative peripherals around; some are still simple and some are complex; needing quite complex programs in the interface to operate efficiently.

The idea of hand-tuning computer systems to each peripheral is now impractical. And the idea of waiting around until the appropriate freedom to handle different peripherals is built into the central processors has proved to be fruitless.

But if we remember that the memory is a real part of the processor and that the peripherals could connect directly to the memory by means of an independent, noncentral processor-controlled interface, the current restrictions on the use of peripherals can be evaded.

Such an interface would naturally require some logic. It would not be human problem type of logic, however. Just peripheral control logic. Logic designers have done a respectable job in handling the logic requirements of disk controllers, so I see no problem there.

This interface would require the use of some reserved memory locations, with resultant addressing complexities. But memory suppliers are quite sophisticated nowadays. Memory addressing has come a long way from being hardwired, as shown, for instance, by Cambridge Memory, Inc.'s floating-addressing systems.

The initiation actions for memory interfacing will require some additional instruction capability, but this can be handled even in today's high-level languages. So I see no technical problem here, either. If necessary, a new input-output instruction sequence could be safely initiated simply by using opposite parity characters to distinguish them from process interface controls.

Two Objections

There are two real objections I see to this style of independent interfacing:

- It can result in redundant circuitry.
- It is unnecessary because of the future standardization of interfaces.

The first objection is valid. There probably will be duplicated circuitry. Interface logic will have to be built into the independent add-on memory fitted to various systems, but it is unlikely that the processor-builders will eliminate their own interfaces from their share of the installations.

However, the use of the independent interface will be strictly optional. I expect it to be field-installable, installed only when the user can expect good financial savings from the connection of better and cheaper independent peripherals so that the savings will outweigh the logic costs.

Current Systems Will Continue

The second objection is, I think, based upon a long-term view that may simply be *too* long-term. True, we may get standard interfaces in years to come. But computers really don't wear out, as the supporters of standard interfaces have been telling us for years.

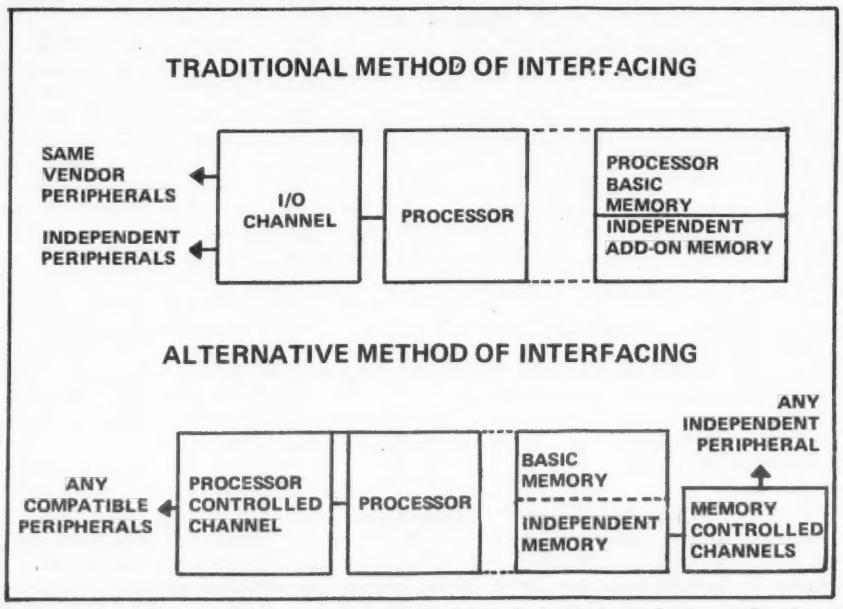
The current installed inventory of computers has to be served and that alone adds up to a substantial market. These cannot wait for the standard to be adopted and then slowly come into use.

So, here is my proposal. Let *both* the central processor people and the memory people – particularly the add-on memory suppliers – supply interface facilities as they select. This way the original manufacturer of the problem-program-processor can provide the facilities for its own stable of peripherals without restricting the ability of the user to obtain others.

There really is no need for peripheral interface technology to have any connection with our problem-program-language!

The memory people will then have to pay the price of duplicating circuitry in order to make their products more valuable to users, but there is nothing wrong with that. It would even lift the "parasite" jeers that they have had to put up with so far.

And it might even open up the use of independent peripherals to the point that a system without an independent interface will be regarded as being defective.



The diagram illustrates the current method of interfacing independent peripherals to computer systems and a possible alternative one. In the current method, only the processor vendor supplies any I/O interface, although in many cases the system memory is supplied by independent memory vendors.

In the alternative method, the ability to connect independent memories can be expanded to add a microprocessed interface to any independent peripheral which can use the programmed interface directly into the memory. Thus peripherals which cannot be connected to current interfaces can be made available to system users, without infringing on the processor manufacturer's freedom to configure its own interface to match its own line of available peripherals.

UPC: Boon or Boondoggle? – Part 2

Stand-Alone ECRs a Viable Supermarket Alternative

By Bob Moneymaker
Special to Computerworld

There are systems now in use which give a close approximation to the data gathering proposed by the proponents of the Universal Product Code (UPC) scanner. It was Confucius who said, "Be not the first to take up the new, nor the last to lay the old aside."

Attention to this dictum would impel supermarkets to take a "modular" approach to the entire problem of new systems in today's retail environment. Establishment of a list of priorities could be helpful.

Any system which is to be cost-effective must impact, positively, the following, ranked in importance to the degree that there are only three primary considerations:

- Accuracy.
- Customer approval.
- Throughput.

Most people would agree that checker accuracy is primary, since better throughput speed must not result in errors which add to the chief unknown in the operation, shrink.

Customer reaction to increased speed can also be a disadvantage. This can vary by geographic area; in the East, there are markets which benefit from reduced customer mobility compared with most of the Western markets. In the West, the calling of prices by the checker is more important, since the customer is within driving distance of three or four competitive markets.

Checker speed which puts the customer at a disadvantage as far as his ability to follow the ring-up procedure argues against excessive throughput.

ECR More Economical

Electronic technology has developed to the point where there are tag-producing devices which will make machine-readable price tags in the store. Scanning prices at a free-standing electronic cash register (ECR) can accomplish all three primary priorities at a much more economical level than a full ECR scanner system.

Making this the first move to the automated front-end will be more acceptable to the supermarket customer as the change would be more gradual.

A slower move to newer checkstands and checker-bagging stations may also be more efficient. Each change could be cost-justified based on benefits and customer reaction.

Finally, this alternative to the UPC scanner system has an added benefit. It requires the comparison of "apples to apples," since we must then be sure that we are replacing the cash register with a better cash register. Getting into the scanning mode, even with retail prices at first, is going to take time.

During this period, we can evaluate the ECR as a checkout tool. Should the scanner malfunction, the keyboarding of the price tag must be at least as efficient as the present register.

If it is a free-standing ECR, the later addition of the scanner without the price lookup file and disk should be straightforward. Should that disk feature be desired, the minicomputer or controller could then be required to provide the file lookup routine for UPC scanning.

The stand-alone ECR would eliminate the need for double minis or for a backup controller, because the free-standing ECR would still be operable if the system went down.

Moneymaker, active in the California food industry for 14 years, is with Systems Consulting Services in Orange, Calif.

Reader Commentary

Letters to the Editor

Nested IFs Solution Not a Complex One

I read J. Dennis Omlor's article on debugging nested IFs [CW, Sept. 4] with mixed emotions. On the one hand, I was pleased to see someone taking an objective look at the question, since I have been an unabashed and outspoken exponent of nested IFs ever since I began programming.

On the other hand, it pained me that Omlor's solution to a very simple problem should be so complex. I suspect that his tables have scared off more people than they have converted.

A much less confusing answer lies in a combination of proper source coding and an easy set of rules. Nested IFs should always be indented in source coding (four spaces is easiest on a standard Cobol coding sheet), and ELSEs should be placed immediately below their corresponding IFs.

Note that this is true even if an ELSE IF condition is required:

```
IF(1),
  IF(2),
    IF(3),
      Imperative statements,
    ELSE(3) Imperative statements,
  ELSE(2) IF(4),
      Imperative statements,
    ELSE(4) Imperative statements,
ELSE(1) Imperative statements.
```

By coding in this manner, the IF-ELSE matchups are obvious and the rules become easy to understand. Test each IF condition and continue to the next if it is true.

If all IFs preceding the first set of imperative statements are true, perform the imperative statements and then go to next sentence (NS). (I am assuming, of course, that these do not contain a GO TO statement.)

If, however, one of the IF conditions is found to be false, control falls to the ELSE immediately below that IF. Perform the imperative statements associated with it, then go to NS.

Bear in mind that only one set of imperative statements can be performed in a pass. A final word of caution to programmers: desk check nested IFs thoroughly, ensuring that a period follows the final imperative statement and that no periods intervene within the sentence.

I hope that this will further my crusade to show not only that nested IFs are a valuable and efficient programming tool, but, more important, that they shouldn't be feared.

M.D. Paterson
Programmer-Analyst
Montreal, Canada

Words of Praise For Clear Style

Just catching up on some back reading and came across "Clear Coding Style Can Cut Need for Nested IF Tables" by William B. Simmons. Excellent and outstanding.

I had seen this style of coding and hoped someone would do as Simmons did in the way of contributing the technique.

Hope to see similar articles in future issues.

H.A. Tompkins
Portland, Ore.

PL/I Should Not Be Dismissed Too Quickly

There have been very few instances when I have felt compelled to respond to a comment. However, the letter from R.A. Baker [CW, Oct. 30] has made me do so.

So much of what Baker says is incorrect that one questions whether the author knows PL/I at all. For example:

- One can pass based variables, both to stream files and as parameter data.
- Parameter data can be used as targets for I/O, including READ INTO.
- The "ambiguous" end statement is not ambiguous at all, even in structured code. Use of END in conjunction with proper nesting in many instances is a boom to the language.
- The optimizing compiler places efficiency where it belongs: in the hands of the compiler and not the applications programmer.
- Baker is correct in stating that there can be no variable format list; PL/I does not allow it. But there are other ways to solve the problems associated with the fixed format list.

I won't even comment on the numbered statements.

Apparently, the author is not only incorrect in most cited instances but is following the tradition of all DP people in clinging to the blanket of past knowledge.

I seriously question the statement "This is not intended to be an outright blast . . . I like the language." Anyone who can make erroneous statements such as was made in that letter certainly doesn't *like* the language.

Lee Milligan
Project Manager
Guide PL/I Implementation
State Farm Insurance Companies
Bloomington, Ill.

Inefficiency Lies With Programmers

I have several points to make in reference to the article entitled "Assembly Language – Popular but 'Inefficient' " [CW, Nov. 20].

How can David Dahm call himself a consultant when he believes Assembler to be inefficient? I would label him inefficient, not Assembler.

He claimed Assembler has been inefficient for 10 years. I wonder if he means his Assembler code has been inefficient for 10 years?

It's quite strange that IBM has chosen to use this inefficient language for their supervisor programs, DOS and OS, Sort/Merge, utilities, language translators, etc. I wonder if he finds it odd that the high-level compilers are written in inefficient Assembler.

So far, I have addressed efficiency in terms of machine efficiency. What about programmer efficiency? In the past 10 years, in the capacity of software specialist, proprietary software author and management consultant, I have found the most efficient language in terms of design-to-production time to be RPG-II. Ask any of the 50,000 System/3 users.

The average Assembler program will have fewer source statements than the average Cobol program. Also, each statement will have fewer characters in Assembler than in Cobol. If the programmer is truly competent in, say, Cobol and Assembler, the design-to-production times will be quite similar.

The whole key to this is not how efficient is the language but, rather, how competent is the programmer.

Since Assembler requires its author to have somewhat more technical expertise, the percentage of mediocre Assembler programmers is higher than the percentage of mediocre Cobol programmers. Let us then find fault with the programmer, not the language.

Dahm claims experiments he has done have shown all high-level languages to be at least 10% more efficient than Assembler. Anyone who is competent in Cobol and Assembler and has an I.Q. greater than hexadecimal 40 knows from experience that Assembler requires less core and executes faster, especially programs with heavy I/O.

I challenge Dahm to provide your newspaper, or myself, or Codasyl or anyone documented proof of his claims. I would also request him to include a source list of the Assembler program he used in his benchmark tests. It is probably a perfect study of how not to code Assembler.

He also claims "we'll never become professional as long as we use Assembler." Whether a person writes Assembler or PL/I has absolutely no bearing upon his being a professional. A person is either professional or unprofessional by nature, regardless of his endeavor.

David A. Westfall
President
Aries Computer Processing
Grosse Pointe Woods, Mich.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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General Community May Benefit

GSA to Demand Standard, Validated Cobol Compilers

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – The biggest DP user group in the world, the U.S. Government, has finally begun to flex its muscle. As a result, "in the next year or two" – in the words of an optimistic observer – the average commercial DP installation may be able to count on getting a standardized compiler when it orders an ANS Cobol compiler.

Currently, federal information processing standards require that Cobol compilers being brought into the federal inventory must fit a specified level of the American National Standards Institute Cobol standard. But the rulings are not clear on who determines if the compilers meet the standards or what happens if they don't.

Now the General Services Administration (GSA), which is responsible for procurement policies, is drafting a regulation requiring that any compiler proposed for government procurement be submitted to the Federal Cobol Compiler Testing Service for validation.

The agency for which the procurement is being conducted will have the option of making an award, even if the compiler fails some of the audit routines, if the vendor's bid otherwise seems the most responsive and responsible of those being considered.

There is a catch, however. Under the rules GSA is developing, the vendor must certify that the deficiencies will be corrected in a stated period of time.

If the corrections are not successfully made in the required time frame, the agency may continue to use the deficient compiler – "the rules are not intended to hurt the user" – but the compiler itself will thereafter be considered unresponsive to user needs and unacceptable for federal procurement.

"They may be able to fool us once," explained Whit Dodson, GSA's assistant commissioner for automatic data management services, but this kind of regulation should provide the "procurement coercion" GSA needs to be sure of getting good compilers.

Even though the proposed regulations apply directly only to federal government procurements, most observers see them as potentially beneficial to the commercial DP shop as well. It is not reasonable, in this view, for vendors to provide to the government compilers that conform to the ANS specifications, while giving nonconforming compilers to the general DP community.

The gist of the proposed GSA regulations was worked out at a high-powered meeting held late last month at the National Bureau of Standards. Attendees included spokesmen for Codasyl's Programming Languages Committee (Cobol development); Ansi's X3J4 Committee (standardization); NBS itself (federal information processing standards); GSA; the federal Cobol testing service; and most of the major hardware vendors.

A secondary result of the meeting will be more coherent handling of interpretations of what the language of the Cobol standard actually means in some ambiguous places. Although Codasyl and X3J4 have attempted to provide interpretations whenever asked, the government set up its own Federal Cobol Interpretation Committee (FCIC) several months ago.

Last month's meeting at NBS reaffirmed the government's right to have such a focal point – just as many commerical DP shops have a single Cobol resource point – and led to assurances from FCIC, PLC and X3J4 that they would indeed all work together.

Beyond that, however, they came to an understanding that published interpretations would have the effect of updating the standard. Thereafter, at some reasonable time (not yet defined), both the compilers being offered for procurement and the audit routines for validating them would have to be updated to reflect whatever changes were mandated by the interpretation.

Retrofitting the changes on installed compilers apparently is not part of the plan at this time.

'Baron' Extends ADR Library

PRINCETON, N.J. – The Business/Accounts Reporting Operating Network (Baron) is the latest extension of the application and service library supported by Applied Data Research (ADR) Time-Sharing Services Division under the Teleplex system.

Baron is a series of both standard and custom-designed programs which, because of their modular construction, can be assembled to satisfy each user's particular needs. The system can be used, according to ADR, to handle accounts payable, accounts receivables and inventory control.

Available throughout the U.S. on toll-free dial-up service, Baron applications include invoices, billings and customer statements. Daily registers can be prepared and accounts aged as billing periods progress; linkages with general ledger routines are also part of Baron's capabilities, ADR added.

The introduction of Baron appears to mark a change in the type of service available under Teleplex. Although there have been some business-oriented programs in ADR's library, most of it has been devoted to providing substantial system software.

Teleplex is based on dual-processor Digital Equipment Corp. Decsystem-10s with 224K words of main memory, "Dectape" and industry-compatible magnetic tapes, fixed-head disk and drum swapping memory and on-line disk storage for data files. The system's executive is supplemented by an Auto-Queue program for "feeding" the multiprogramming batch system.

Languages available to the Teleplex user include Algol, APL, Basic, Cobol and Fortran. Other parts of the system are Macro-10, an assembler; Snobol; Lisp; a data base management system; and a choice of editors and debugging tools.

ADR has five local offices on the East Coast and another one in Chicago. The company is based at the Route 206 Center, here in Princeton, 08540.

Search Features in 'Kwicscan' Available for Data File Inquiry

NEW YORK – The search capabilities built into the Key Word in Context Scanner (Kwicscan) make the package useful not only as a development, debugging and documentation tool to be used against programs, but as an inquiry tool to be applied against data files as well, according to the vendor, Franklin Computer Associates.

Working under OS/360-370 or OS/VS, Kwicscan scans source programs – in BAL or higher level languages – for user-specified symbols or character strings. In development work, this capability could isolate references to data fields across program boundaries so that the impact of any proposed change in the system is more easily seen, the company said.

The scan in that instance might use a known data field name as the search argument, but another approach – for situations in which the user wants to add a new field – would use the new name as the search key, just to make sure it hadn't already been used somewhere in the system for some other purpose.

In support of debugging operations, Kwicscan can search for and report all instances within a program that reference a procedure label or macro statement. This study might identify where an invalid and possibly unintended change is being made in otherwise good code, or simply trace file activity during processing by checking references to OPEN, CLOSE, READ and WRITE statements, the vendor explained.

Kwicscan can be used to scan for character data, both alpha and numeric, in any sequential file. It might be used, the vendor suggested, to cross-reference a book bibliography, listing titles by key words, or to search through files for all occurrences of particular information.

Franklin Computer Associates is at 80 Pine St., 10005.

'Jasper' Update Analyzes Page Fault Statistics

NEW YORK – A Page Rate Analysis Report, available as an extra-cost option for the Job Accounting System Performance Evaluation Report (Jasper) package from Datachron Corp., is designed to give the DOS/VS user better perspective on page fault statistics.

The basic Jasper provides for user billing, system utilization reporting and analysis of job, operator and component performance on IBM 360s or 370s under DOS or DOS/VS. Particular attention is paid to operations scheduling and reports to aid management in planning better workload mixes and recognizing problem jobs, Datachron noted.

The new enhancement collects paging activity by program and by partition and displays the data in a format that should help the user spot degradation, optimize job mix and improve overall throughput, the vendor said.

Rather than showing total page faults per program, the Jasper analysis divides each program total by the number of minutes the program took. Jobs active, faults for each partition, total faults, CPU rate (number of CPU seconds/elapsed minute) by partition and in total, and overhead and I/O rates are all shown minute-by-minute in the new report form.

As an additional capability, the page rates developed in the analysis run are accumulated on an historic file to enable users to compare current processing with past performance. Deviations within a predefined percentage of expected performance can be listed on an exception report, the vendor said.

The basic Jasper system for an IBM 370 DOS/VS installation costs $4,000. The new paging activity reports cost an additional $1,000, Datachron said from 174 Fifth Ave., 10010.

High School Students Invited To Enter Programming Contest

WASHINGTON, D.C. – Secondary school students have a chance to show their programming abilities and possibly win a savings bond and a trip to Virginia Beach, Va., next spring, by entering the 12th annual programming contest sponsored by the Association for Educational Data Systems (Aeds).

The competition is open to students in grades 7 through 12, and projects may be submitted by individuals or by teams of students. All entries must be received by March 1, according to Dr. Gary Bitter of Arizona State University, contest director.

Separate first prizes will be awarded in each of seven areas: business, biological science, computer science, games, humanities, mathematics and physical science. A grand prizewinner will be selected from among the winners in the individual catagories.

The grand prize will be a $100 U.S. savings bond and an all-expenses paid trip for both the student and his sponsoring teacher to the Aeds convention in Virginia Beach in late April and early May.

The category winners each will receive a $25 savings bond, the association noted.

If the grand-prizewinning project is submitted by a team, the team must select one of its members to make the trip to the convention, Aeds added.

No Limits

Nothing in the rules and guidelines to the contest appears to limit the participant's choice of programming language or machine. There is, however, a requirement that the application include a letter from the student's teacher certifying the submitted program has actually been tested and run on a computer.

The guidelines also spell out a substantial package of documentation which "must be clear and complete enough so that someone else could use the program."

Bitter stressed "the description and documentation of the project should be considered as important as the development and debugging of the program."

More information and application blanks for the contest, which is on the approved list of national contests and activities of the National Association of Secondary School Principals for 1975, may be requested from Bitter at the College of Education, Arizona State University, Tempe, Ariz., 85281.

Aeds is at 1201 Sixteenth St. N.W., here in Washington, 20036.

Car Leasing Package Includes Training

IRVINE, Calif. – Banks considering leasing automobiles to consumers can apparently get a headstart with programs to handle the operation – and help in training people to work with the programs – under a package plan now available from Autolease Data Systems.

The software portion of the package generates detailed accounting reports, customer billing, insurance and collection follow-up. The programs cover "everything" from extensive edit routines for the input data through file maintenance and including management, sales and dealer reporting capabilities, according to the vendor.

Although originally designed to handle automobile leasing, the system is structured in such a way that virtually any type of large-scale equipment could be accommodated, Autolease said.

The software utilizes three interrelated files, all referenced to the bank customer. The files cover the name and address of the leasee, the history of the lease and the equipment being leased, the vendor said, adding that the files may be on either tape or disk.

The training portion of the package includes on-site presentations by Autolease personnel and detailed manuals covering the responsibilities of the installment loan, operations and DP departments of the using bank. The training is said to include each step from the procuring of leases through termination and – finally – the sale of lease vehicles.

Autolease is prepared to provide the package plan, including the on-site training, to any bank in the U.S. The software is currently implemented to run, without overlays, in 100K bytes on an IBM 360 or 370 under DOS, OS or VS.

The package, including ANS or Cobol F source code, can be acquired from Autolease, P.O. Box 4505, 92664, for a one-time charge of $37,500.

Lockheed System III Gets Fortran Compiler

LOS ANGELES – A Fortran compiler is now available as an extra-cost option for users of the Lockheed System III working in a DOS environment. The new compiler is said to comply fully with the 1966 ANS requirements.

While RPG-II and Assembler processors already available support business-oriented DP on the small system, Fortran "significantly expands" its potential in the scientific and engineering areas, a Lockheed source noted.

Other Files Usable

The compiler executes in 24K bytes and supports all peripherals for the System III. Fortran programmers have the ability to exit to Assembler language routines for special application requirements, and disk files created by RPG-II or Assembler programs may be used by Fortran programs, the spokesman added.

In addition to 24K bytes of main storage, the Fortran compiler requires a 5M-byte 5440-type disk drive, a CRT keyboard-console and 100 char./sec printer.

The new language processor is being distributed on a disk pack for a one-time charge of $2,200, Lockheed's Data Products Division said from 6201 E. Randolph St., 90040.

Quantitative Analysis of DP Center Ups Efficiency

By Barry A. Stevens
Special to Computerworld

A highly analytical, quantitative approach to overall data center performance improvement exists which, when rigorously applied can produce significant, even spectacular results, often without serious expenditures for additional computer hardware.

Concepts and Techniques

The discipline might best be termed "computer operations engineering." It employs standard performance measurement tools for system hardware and software and some not-so-standard tools to analyze other performance factors, such as personnel movement, materials flow, processing errors, data center procedures and layout.

There are two important keys to the method. First, the use of a total data center system in the analysis; second, the thorough application of appropriate quantitative measures of performance for all elements of that system.

The total data center definition of system includes all elements of data center processing encountered by units of work as they enter and eventually leave data center facilities. Each of these elements acts upon each unit of work that passes through, requires a certain amount of processing time, may or may not make errors and operates at a certain cost.

The sum of all processing times for a unit of work in the data center is its turnaround time. Typical data center processing elements include input/output handling, data control, data entry, tape library, job scheduling, job setup, operator interface, materials movement and machine processing.

The use of appropriate performance measures is critical to the success of this method. Three classes of measures – timeliness, accuracy and cost – are applied to each element of data center processing. Tools employed for data collection vary with the resource being measured.

Hardware and software performance measurement tools are, of course, used where needed. In OS/360-370 shops this data may be combined with that available from SMF analysis packages to produce system and job stream performance characteristics, and the combined data can be used to produce a detailed guide for hardware/software planning.

Time and motion studies are employed to determine the effect of manual factors on data center processing. Manual data collection is employed in the analysis of data center functions, yielding the timeliness, accuracy and cost of processing as well as an indication of personnel loading as a function of workload.

Other data collected refer to processing errors, wherever they occur in the data center. Each error is recorded, identified and traced to its source.

Thorough application of this technique culminates in the analysis and ranking in relative importance of the data obtained, and this data is used to structure an action plan for the solution of the largest problem identified.

Results obtained using this method are often surprising. It is not at all unusual to find a data center with a workload spending over 75% of its time tied up in procedures, materials movement, operator interaction or just plain waiting.

An approach which treats a data center as a total system can identify these problems and provide a useful basis for revision.

Stevens is president of the Boole & Babbage Users Group (BBUG); he works at Peat Marwick & Mitchell in New York City.

Registers at Abend Widely Used Method

By Harmon R. Feig
Special to Computerworld

My article, "Files Can Be Found Through Dump, Register Reviews" [CW, Aug. 7] discussed the use of registers at Abend in solving Open, Close and/or End-of-Volume (EOV) system interruptions.

Several weeks later, "Register Contents at Entry to Abend Not Preferred for Debugging Work," by Lewis Copley Jr. [CW, Sept. 11], criticized my use of registers at entry to abend. Copley stated "The registers at Abend are not the preferred registers to use when attempting to debug OS-detected interrupts involving Open, Close and EOV. The analyst who places his trust in these registers as being valid predictors can be compared to the individual who unabashedly trusts the weather forecast. The fact that the methods provided by Feig work . . . can be attributed to two factors: (1) his configuration and (2) extreme good fortune."

Rebuttal

I unequivocably take exception to this statement. Techniques I use are also used throughout IBM manuals. For example, the IBM Field Engineering Handbook (order number 229-3169-1) presents a list of the register conventions used by Open, Close and EOV on Page 42. This clearly indicates register 2 contains the address of the DCB for Open and Close system interruptions.

The Technical Information Exchange written by David G. Walsh, IBM, Wheaton Md. states, "Unless otherwise noted all references to registers are "REGS AT ENTRY TO ABEND." Also, on Page 31 of Walsh's booklet, he uses register 2 (identical to method #2 in my article) in solving an Open, Close and EOV system interruption.

The IBM manual OS Open/Close/EOV Logic (order number GY28-6609-6), page 195 indicates register 2 contains the DCB and register 11 contains the DEB throughout DCB processing.

Feig is a member of the information systems staff at Western Electric in New York City.

SBC Service Monitors Value of Collateral Behind Secured Loans

GREENWICH, Conn. – Users can monitor the collateral value behind secured loans through the Collateral Loan Margin Reporting System (Colmar), a service now available on Service Bureau Co.'s (SBC) international management-oriented time-sharing operation, Call/370.

Colmar is said to generate margin reports "as often as stock market conditions warrant" in order to provide greater control over loan portfolios. Working against SBC's existing data base of more than 21,000 securities, Colmar values loans and alerts users to those that are undermargined.

The system can handle any form of collateral including real estate, jewelry or pieces of art, SBC claimed. The user may update his file with additional loans, payments on existing loans or changes in collateral at any time.

Periodic reports can cover all loans in the user's file or specified subsections of it. The printouts may include collateral description, price and margin, and they can be summarized to include total market value, total loan value and the amount over or under margin.

Colmar is available in most major U.S. cities through SBC offices and in Canada and Europe through the offices of Control Data Corp., SBC's parent corporation.

SBC is based at 500 W. Putnam Ave., 06830.

Letters Written On Datapoint 2200

FALL RIVER, Mass. – Selective letter writing, with names and addresses inserted from a file or keyboard, is supported on the Datapoint 2200 through an add-on option to the disk mailing list system from Bristol Information Systems, Inc.

Written in Datashare III, Datapoint's time-sharing language, the letter writer provides access to "several hundred" letters stored on disk or cassette and to the name and address file used by the mailing list system. Filed names are selectable through Boolean logic facilities already in the mailing list system, Bristol noted.

The system utilizes the Datapoint text editor which supports as many as 256 "files" (or portions of letters, in this context) on a disk.

Described as simpler in design and intention than Datapoint's Scribe package for text processing, the independent vendor's list/letter writing system runs on any Datapoint 2200 with 16K bytes of memory, one disk and a Diablo servo printer or Centronics remote unit.

The mailing list system sells for $400; the letter writing add-on is an extra $350. Only object code is provided.

Bristol can be reached through P.O. Box 2133, 02722.

COMMUNICATIONS

DEC Full-Duplex Protocol May Surpass IBM's SDLC

By Ronald A. Frank
Of the CW Staff

MAYNARD, Mass. – Digital Equipment Corp. (DEC) has developed a full-duplex message-oriented data communications protocol that has advantages over IBM's binary synchronous and Synchronous Data Link Control (SDLC). The new protocol is known as Digital Data Communications Message Protocol (DDCMP).

There are several advantages to the new protocol, according to its originator Stuart Wecker, who is a network architect at DEC: the protocol makes full-duplex use of a four-wire facility; on links with long delay times, such as satellite circuits, it runs more efficiently than other protocols; it is compatible with existing DEC hardware; and it operates in both serial synchronous and serial asynchronous as well as parallel modes.

DDCMP operates with installed DEC hardware in either half-duplex or full-duplex modes point-to-point or multipoint, and it can have many messages outstanding on the data link before an acknowledgment is required, Wecker explained.

In contrast, SDLC cannot operate on existing hardware, he said, because it requires new bit-stuffing hardware that many vendors are now developing for an SDLC interface.

Philosophies Similar

Except for the hardware compatibility, Wecker said the two protocols are extremely similar in internal design philosophies and operate almost in the same kind of mode. "For a user looking at both, they basically perform the same functions," he said.

One difference in DDCMP is that DEC has developed a method for bootstrapping a CPU so that it can be "downline loaded over a communications line," he said. SDLC does not specify any method for this type of function, he added.

So far the code implementations of DDCMP are from non-DEC sources. The first DEC implementation is designated TC/D and is a terminal concentrator for the RSX-110 real-time system, Wecker said.

Wecker described the TC/D as a front-end concentrator that can support terminals and maintain one high-speed line back to the central site host CPU or another RSX-11D system. The high-speed link uses DDCMP, he explained.

Another DEC implementation is called DC 72 and uses a PDP-8 as a remote station with a card reader line printer and up to 16 terminals. It operates on-line with a Decsystem 10 mainframe and uses DDCMP between the remote location and the CPU.

A later version will use the PDP-11 and will be designated the DC 75.

A non-DEC implementation is available from Digital Communications Associates of Atlanta, Ga. That company has introduced its version of the Decsystem 10 remote station, also using the PDP-8 with the new protocol.

Concurrent Applications

The advantage of the remote station configurations is that they allow both remote batch and on-line terminal applications to run concurrently. When only the card reader and printer are supported, the remote station operates similar to the IBM 2780 mode, but when the terminals are added the mini becomes a remote concentrator.

DEC has thus far implemented DDCMP on the PDP-8, -11, -15 and the Decsystem 10. It can be easily implemented on any character interrupt processors and on direct memory access devices, Wecker said.

The protocol achieves data transparency by use of a count field, Wecker said. In the header of the message there is a count field which specifies the length of the data field; the user then simply takes that many data characters, he said.

DDCMP does no scanning for special control characters anywhere in the data field so the protocol is always transparent. Because nothing is added to the data content it always operates within 8-bit boundaries, making it possible to transmit either serial synchronous or serial asynchronous without any difficulties, he added.

DDCMP has operated successfully up to 50 kbit/sec on synchronous lines and up to 9,000 bit/sec on asynchronous lines, he said. The protocol can be adapted to present software by writing the code to perform the data link functions according to specifications available from DEC. This program can then be interfaced to existing operating systems.

The DDCMP functions require about 500 to 1,000 words of storage on a 16-bit processor. The length would be about the same in microcode implementations.

Transaction System Incorporates DDCMP

MAYNARD, Mass. – A terminal control enhancement providing up to 80 terminals with access to the transaction-processing capabilities of the RSX-11D real-time operating system has been introduced by Digital Equipment Corp. (DEC) It is the first implementation of DEC's new Digital Data Communications Message Protocol (DDCMP).

A data communications extension to the RSX-11D operating system, the TC/D is designed to satisfy the need for volume transaction processing, the company said.

The enhancement is available as part of a PDP-11-based communication system that employs RSX-11D or as an addition to existing multiterminal RSX-11D systems, it added.

Said to concentrate data from a number of terminals onto a single high-speed line, the enhancement also permits card readers and line printers to be used at remote sites.

The company said the TC/D provides a transparent link between application programs in the RSX-11D system and many terminal devices. The enhancement can be installed on an existing system without reassembling or relinking the application programs.

The company also noted a transaction processing system can be developed locally on RSX-11D and remote TC/D sites added later.

An existing RSX-11D system with terminals can be upgraded with the enhancement for about $20,000, according to DEC. A typical transaction processing system using an RSX-11D system with the TC/D would cost about $180,000.

Delivery of TC/D is scheduled for May 1975 from the company in Maynard, 01754.

Third-Party Teletypes Cut DCS Budget by 20%

By Edith Holmes
Of the CW Staff

DETROIT – By leasing low-speed Teletypes from third-party lessors, a computer services company here estimates its expenses are 20% less than the firm would pay if it rented similar equipment

Ford Dealer Computer Services (DCS) went to third-party leasing companies for 300 bit/sec terminals after a Federal Communications Commission ruling forced the Bell system to sell its dial-up teletypewriter service to Western Union in April of 1971, Jim Cnossen, activity manager for DCS, explained.

"Like so many other companies, we required the dial-up service Western Union didn't provide at the time," he said.

Cnossen added that leasing companies "have the horsepower and the talent that DCS doesn't have to service these terminals." The pace of technology moves too rapidly, he indicated, to seriously consider purchasing such equipment.

Providing basic accounting, inventory, payroll and other management computer services nationwide for Ford and Lincoln auto dealerships on a charge basis, DCS depends on telecommunications for most of these applications and uses the TTY as its primary input device.

Reports travel to and from the dealerships over dial-up lines, Doug Mullen, manager of systems development and control for the activity, said. Incoming data is processed on an IBM 370/158, located at Ford's main computer center in Dearborn, Mich., and daily exchanges of information take place over the terminals.

Operating on-line to the dealerships during the business day, the system continues unattended collection during the evening and sends exception reports to the dealerships in the early morning hours, Mullen noted.

DCS presently leases an estimated 1,100 ASR 33 Teletypes with modems from Leasco Data Communications, according to a spokesman for the leasing company.

Cnossen commented that his firm also uses TTYs supplied by RCA Service Co. and other leasing vendors.

While he noted Leasco is DCS's biggest supplier, Cnossen stressed the importance of a multivendor environment.

"When DCS evaluated several Teletype vendors back in '71, management considered both price and service capability of major importance," he remarked. "We had to make sure the vendor could adequately cover certain metropolitan areas serviced by DCS, and at the time Leasco lacked strength in the western part of the country."

But Cnossen said Leasco remains his company's largest vendor, primarily because of its service support capability.

"We appreciate the fact that any of the dealerships we service can phone in a problem via an 800 Wats number to Leasco's national service center," Mullen said.

DCS also receives a weekly profile of satisfied and outstanding service requests from the leasing company at no additional charge. "I know of no other vendor who provides this service," he added.

Maintenance Concept

Leasco agreed that its maintenance concept is the key to its leasing system. Art Gallo, national sales manager for the firm, explained that Leasco maintains customer files in a data base containing information on each of the 6,000 machines operating in the field.

"Twenty-five percent of all service calls to the national center in Germantown, Md., can be diagnosed by technicians and automatic testing equipment over the telephone," Gallo remarked. "When the problem can't be isolated by phone, service personnel are dispatched from the Germantown headquarters with orders to call in every two hours to update the data base on the terminals serviced and to receive new assignments."

The information received from these calls forms the basis for Leasco's open and closed trouble call reports, which provide customers with weekly listings of

(Continued on Page 18)

Datatrol Interactive Terminal Allows Application Flexibility

HUDSON, Mass. – An interactive data terminal introduced by Datatrol, Inc. is modular in design, providing application flexibility, according to the firm.

Developed as an alternative to CRT displays where the data entry or retrieval functions remain relatively fixed, the IDT-6000 includes a numeric keyboard plus a set of customized special function keys, the company said.

The terminal has a 16-digit numeric display and a panel of illuminated message windows. All 104 message windows can be tailored to a specific application, the firm emphasized.

'Menu Selection'

These messages, which show up against the terminal's "dead front" panel, can be used to guide the user in data entry, to provide intermediate and final responses to define the meaning of the contents of the numeric display and to permit "menu selection" choices.

Featuring a matrix of illuminated messages in eight rows of eight columns, "menu selection" is said to minimize key strokes and eliminate the need for the user to remember multiple codes.

Options available with the IDT-6000 terminal include a strip printer, an Ascii channel and a calculator.

I/O Subsystem

When used in conjunction with the firm's TP-6000 terminal processor, the IDT-6000 provides an interactive data terminal input/output subsystem that can be interfaced to any host computer system, according to the company.

Modularly expandable, the TP-6000 is said to provide control for 15, 30 and 60 terminals in a single location. Terminals are hard-wired to the processor using four-wire cables up to 1,000 feet long, the company said.

Transmitting in asynchronous protocols at 1,200 bit/sec, the TP-6000 also supports other Ascii terminals.

The basic IDT-6000 terminal is priced below $1,500 and controller prices begin at $3,000.

The firm is located at Kane Industrial Drive, 01749.

Third-Party Teletypes Save 20%

(Continued from Page 17)

trouble spots, reported times, Leasco response times and both identified and unresolved problems, he said.

The data base also enables Leasco to generate additional reports for its customers depending on their needs. Companies desiring direct access to their files at the service center can check on the status of their leased machines themselves for the cost of the connect time, Gallo added.

Cnossen said that in his experience Leasco has been "typically responsive" to the hardware needs of dealerships serviced by DCS. He also praised the performance quality of the leasing company's service personnel.

Now, with an eye toward reducing costs and increasing data transmission integrity, DCS has entered into a program to test 1,200 bit/sec terminals for data entry. Cnossen anticipates most dealerships eventually will use the higher speed teleprinters acquired through some third-party leasing arrangement.

'Supercap' Register Acts as Stand-Alone Or in POS System

MAYNARD, Mass. – An electronic cash register which operates either in stand-alone mode or as part of a point-of-sale (POS) system has been introduced by Data Terminal Systems, Inc.

Designed to provide management reports and automatic checkout features, Supercap features either 12 or 24 department, 12 transaction and 10 summary totals, according to the firm.

The register is also said to offer automatic food stamp handling and due bill issuance, tax calculation, multiple quantity price expansion and split pricing.

Store managers can receive totals for each clerk's transactions, dollar sales by department and individual item counts and dollar activity, the vendor said.

Data Terminal Systems 'Supercap'

An optional 256-item price lookup is available with the device. Supercap can be programmed to retrieve price information from a self-contained memory and to total customer orders, in addition to adjusting department and transaction totals, the company said.

Training mode and interfaces for coin dispensers and electronic front-end scales are also available, according to the vendor.

The basic unit can be obtained for $2,850 from the firm at 124 Acton St., 01754.

'Plato' Service Offers Private Line Optimization

SCARSDALE, N.Y. – The James E. Ruttenberg Co., a telecommunications consulting firm, has introduced a private line optimization service known as Private Line Analysis and Telpak Optimization (Plato). The service is designed to help corporate communications managers reduce operating costs of their private line nets.

The Plato service includes an analysis of a company's existing network compared with alternative services. These could include specialized carriers and satellite services depending on the user's communications goals, a spokesman said.

The service is available to both large and small companies and costs are based on a percentage of a customer's yearly phone bill. The average fee is about 3%, a spokesman estimated. The firm is at Two Overhill Rd., 10583.

Interface Adapter Meets RS-232 Needs

PHOENIX – United Data Services Co., Inc. has developed a dc current loop TTY adapter for use with computer terminals requiring E.I.A. RS-232 voltage interfaces.

Designed for interfacing CRT display units and other terminal equipment with teleprint networks, computer TTY ports and other existing TTY facilities, the interface adapter is said to convert the voltage interface of the terminal to separate electrically isolated, dc current send and receive signal lines.

The company noted that strapping options allow its use in two-wire half-duplex, three-wire neutral or four-wire full-duplex circuits.

Priced at $97.50, the interface adapter is available immediately from the company at 3024 North 33rd Drive, 85017.

Uses Qume Printer

Qualterm Terminal Micro-Based

SAN JOSE, Calif. – A teleprocessing terminal based on a microcomputer-controlled system with keyboard input incorporating a Qume 30 char./sec printer has been introduced by Qualterm.

Designed for users requiring small to medium batch terminals, the X100 has an optional single or dual floppy disk memory, according to the firm.

While primarily intended for teleprocessing, the device can be used as a printer, a plotter or an office typewriter, it added.

The basic terminal communicates via Ascii code in an asynchronous mode, using the EIA standard RS-232C interface. Transmission characteristics are said to include either half- or full-duplex mode and speeds of 110-, 150- or 300 bit/sec.

Other standard features on the X100, Qualterm noted, include a graphics mode with plotting at 5,760 points per square inch, vertical pitch and proportional spacing, sub- and superscripting, both forward and reverse half-line feeds and pagination.

Fully buffered, the unit requires no CR, LF or FF delays, the firm said.

Print Features

The device's printing characteristics consist of a character set of 94 Ascii printable characters, a print rage of 10-, 15- or 30 char./sec, with 45 char./sec optional, and graphic spacing of 120 bidirectional positions per inch horizontally and 48 vertically.

The company added that the X100 accommodates continuous or single-sheet forms up to 15-in. wide and 12 parts in thickness.

A variety of options are available with the terminal, according to the firm.

The standard X100 costs $4,985 and can be delivered in 30 days from the company at 2005 O'Toole Ave., 95131.

Intelligent Data Entry Terminal, CRT Text Editor Released by SYS

HACKENSACK, N.J. – A general-purpose intelligent data entry and correction CRT terminal introduced by SYS Computer Corp. features a 132-column display designed to give the user compatibility with hard-copy outputs without reformatting data.

The company has also released a stand-alone CRT terminal text editor that can be configured for word-processing or intelligent data entry systems.

The Model 500-GP general-purpose terminal can be expanded from stand-alone to 8 terminal clusters using identical software and modular hardware, according to the firm. Data can also be entered from a DP facility via the communication line.

With standard Ascii upper and lower case, numerics and punctuation, the device has a data capacity of up to 8,000 characters for the stand-alone terminal and up to 32,000 characters for the 8 display cluster version.

The 500-GP features a single or dual column display format and a 5 by 7 dot matrix generator, with up to 6,336 characters in a 132 by 48 array on a 14-in. CRT, the vendor added.

Other features on the unit include reverse video emphasis, scrolling, character strike-over, word wraparound and decimal alignment.

The vendor's text editor, the Model 500-TE, provides an 8,000-character data capacity, with up to 4,000 characters displayable at one time on a 14-in. screen in a 100 by 40 array.

Data can be browsed or edited by scrolling up and down as well as left and right up to 165 characters, the vendor said.

The firm said other major features include monospace justification, search and replace routines for any word or character string, highlighting of any word, sentence or paragraph, line length settings from 30 to 100 characters, single or dual column display and an Ascii character repertoire.

With four modes of emphasis – reverse video, underline, blink and dual intensity – the terminal can be interfaced to all computers, the vendor claimed.

The vendor noted that the 500-GP has the RS-232C asynchronous interface; the 500-TE, the RS-232 asynchronous interface.

Model 500-TE communication options include either a serial synchronous interface up to 9,600 bit/sec or a parallel interface up to 15,000 char./sec.

The 500-GP has similar serial and parallel transmission rates, according to the firm. Communication mode on the general-purpose terminal is half or full duplex, and synchronous line or parallel data channel interfaces are optional.

The 500-GP is available within 120 days, and prices range from $7,500 to $35,000. With its prices beginning at $7,000, the 500-TE can be obtained in 90 to 120 days.

SYS Computer Corp. is located at 17-25 Di Carolis Court, 07601.

Sycor 340 Gets Cyrillics

ANN ARBOR, Mich. – Sycor, Inc. will equip its Model 340 terminal with a Cyrillic keyboard for use in the Soviet Union.

The Model 340 terminal keyboard and display will contain both Cyrillic and English upper-case character sets. The terminal can be operated with standard Sycor manuals and software, but all input/output data transferred will conform to Russian Riad code standards.

With Double-Height Characters

Dual Display Available on KSR, RO Terminals

ANN ARBOR, Mich. – Dual display is now available on read-only (RO) and keyboard send-receive KSR CRT terminals from Ann Arbor Terminals, Inc.

Allowing users to select either 512 standard size or 256 double-height characters under command or switch control, Model 1632 terminals can be obtained in desk-top and modular configurations, according to the company.

The 512-character format displays 16 32-character lines, while the 256-character format shows eight 32-character lines, the company said.

The double-height 256-character display mode of the Model 1632 is said to be designed for applications where readability at distances up to 30 feet is occasionally more important than the ability to display up to 512 normal-size characters.

In addition, blink, intensity and reverse video may be included for accenting desired characters. Switch-selectable page and roll modes for displaying either tabular or textual data are standard, the vendor remarked.

The terminals come with all standard interfaces, as well as standard single or switch-selectable data rates from 110 to 9,600 bit/sec. A multidrop option permits multiple terminals to share a common data line, the vendor said.

The dual display terminals in Design III desk-top, Series 200 modular configurations and board set configurations range in price from $740 to $1,890 from the company at 6107 Jackson Road, 48103.

Tycom Coupler Fits Bell Modem

FAIRFIELD, N.J. – Tycom Systems Corp. has released an acoustic coupler compatible with the Bell 103A modem.

Operating at rates up to 300 bit/sec, the Model 920 originate-only acoustic coupler automatically switches between data and acoustic modes, according to Tycom.

The company also noted the coupler can be used with any terminal having an EIA RS-232 connector and that it can switch from full- to half-duplex mode.

The device comes with a carrier detect light, a direct access arrangement (DAA) and an IC-regulated power supply, the firm said.

Priced at $199.50, the unit is available off-the-shelf from 26 Just Road, 07006.

United Airlines Cuts Ticket-Printing Time Down to Five Minutes

DENVER – Direct connection of customer teletypewriters to the United Airlines reservation computer center here has allowed the airline to print out teletickets in a customer's office five minutes after an order, instead of the two hours the process previously needed.

The company's system is an expansion of the airline's use of ticket printers in travel agencies and large commercial accounts in the U.S.

Previously a customer phoned a United Airlines reservations sales office where an agent at a CRT checked the airline's central reservation system for space availability, fare and other information.

A ticket was then manually handwritten in the reservations sales office, converted to punched paper tape and transmitted to the customer's office about two hours later.

Under United's more automated system, the customer phones one of the airline's sales offices and the agent inputs the passenger's itinerary into the company's reservation computer system here. The agent then directs the system to format the ticket, establish the price, dial the teletypewriter receiver in the customer's office and print the ticket.

The ticket can be in the customer's office five minutes after he ordered it or the airline's system can hold tickets for delivery at a specific time of day. Transmissions can also be held so that batches of tickets for large accounts can be sent at a prescheduled time during the day.

Polar Adapter Replacement Offered by Terminal Systems

NORTH HOLLYWOOD, Calif. – A solid-state replacement for Teletype Corp.'s long card and polar adapter, used in Telex machines, is available from Terminal Systems, Inc.

Manufactured as a single circuit card, the TLX 101 operates in Teletype Models 32ASR-TM and 32KSR and can be obtained in a low voltage polar version, the company said.

The unit sells for $200 from the firm at 11300 Hartland St., 91605.

Pay As You Go

NEW YORK – MCI Telecommunications Corp. has announced a pay-as-you-use private-line service called Quickline. Initially the service will be offered between New York and Chicago and Washington, D.C. and Pittsburgh.

The rate structure for Quickline service includes a monthly service charge of $54.90 at each customer location and a charge per minute of usage that varies with the pair of cities connected: New York-Chicago, 27 cents; New York-Washington, D.C., 16 cents; New York-Cleveland, 20 cents; New York-Pittsburgh, 18 cents.

Usage charges are subject to a monthly minimum of $75. There is a one-time installation charge of $50 per customer location.

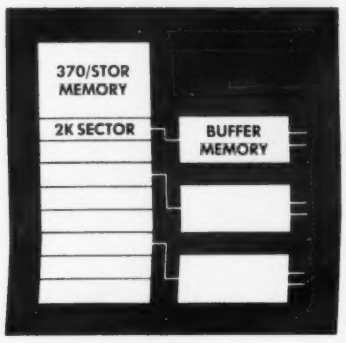
When usage of Quickline service reaches the point where a flat-rate, conventional private line would be more economical, MCI will convert the service.

Progress Report:

370/STOR 155 & 165

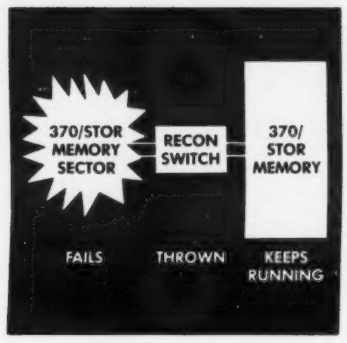
WHEN WE TELL YOU THESE MEMORIES EXCEED 99% UPTIME, WE ALSO TELL YOU WHY.

For a long time, Cambridge has claimed its 370/STOR 155 and 165 memories for IBM Model 155 and 165 processors are the most reliable you can get. Our users tell us they experience better than 99 per cent uptime. The statistic sounds impressive. But not nearly as impressive as the features that Cambridge builds into 370/STOR to assure its reliability under any operating circumstance. We look at it this way: if you add the features to assure the uptime, you'll have the uptime. At Cambridge, we don't leave anything to chance.



STORAGE PROTECTION

Every 370/STOR memory has a separate buffer memory for each 2K-byte sector of main memory. Whether your main memory capacity is 512K or 4096K bytes, every 2K-block is protected from illegal commands, addresses or accesses by our storage protect buffer. A no-cost feature that eliminates a major memory hang-up problem.

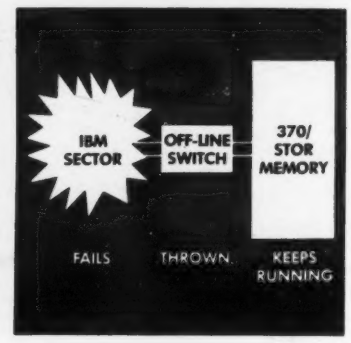


RECONFIGURATION SWITCH

In most memories, a failure in one sector causes a total memory failure. In 370/STOR, a reconfiguration switch lets users dial out a failed sector, while the remaining memory runs at its full capacity. Not only do you keep running, but you minimize time loss. Because with the switch, you correct in minutes what ordinarily takes hours to fix.

ACTIVE SPARES

Some users want even more uptime protection than a reconfiguration switch provides. For them, Cambridge provides an option which incorporates a complete set of spare memory modules which are in a constant standby mode during operations. In the event of a failure, the bad module is dialed out, and a spare one dialed in. That way, the user is virtually always running at maximum capacity.



OFF-LINE SWITCH

Some users have IBM memory resident on their 155 and 165 processors. If the IBM memory fails, the other memory stops running – but not 370/STOR. Our off-line switch lets operators dial out failed IBM memory, and the computer keeps running on 370/STOR memory alone. Cambridge: where high uptime is no accident.

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A good place to put your information.

cmi Cambridge Memories, Inc. 12 Crosby Drive, Bedford, Mass. 01730 (617) 271-6400

Contact our sales offices for further information: Boston (617) 271-6400 • Hartford (203) 633-8714 • Philadelphia (215) 295-1186 • Columbus, O. (614) 459-0154 • Kansas City (913) 371-3352 • Atlanta (404) 252-1382 • San Francisco (415) 692-4806 • New York City (201) 947-0184 • Rochester (716) 637-2229 • Chicago (312) 449-5260 • Detroit (313) 557-4080 • Washington, D.C. (301) 657-9105/6 • Dallas (214) 231-4804 • Los Angeles (213) 822-1166.

Bits & Pieces

Sorbus Program Adds 029 Features to 024, 026

KING OF PRUSSIA, Pa. – A program that may answer the need of the IBM 024 or 026 user who wants more reliability and productivity from his existing data prep gear has been introduced by Sorbus Inc.

The keypunch enhancement service takes existing 024 and 026 keypunch equipment, reconditions it and upgrades it to the capability of the IBM 029 card punch, Sorbus said. A 64-character keyboard and print unit are added, and punching, duplicating, skipping and printing are enhanced to perform at the same speed as the IBM 029.

Improved circuitry is incorporated to provide the "quiet, reliable operation of modern-day DP equipment," the company added.

The enhanced equipment comes with a 30-day warranty on parts and labor and will be maintained by Sorbus.

Sorbus said it can complete the keypunch enhancement in 30 days from date of receipt of the 024 or 026 at its reconditioning plant here. "Loaners" are provided at no additional cost during that period.

The price for the service is $1,650 for the 026, and $2,050 for the 024 plus applicable shipping charges. Sorbus is at 875 First Ave., 19406.

3M Releases Brief Details Of Smaller Data Cartridge

ST. PAUL, Minn. – A miniaturized version of 3M's Scotch brand DC-300A data cartridge and tape drive are under development at 3M's laboratories, according to 3M.

The minicartridge is being designed as a "more reliable and better performing replacement" for the standard Philips data cassette, 3M said. The firm also claimed the minicartridge will offer the same performance characteristics and operate at the same speed as the DC-300A.

The minicartridge is slightly smaller than the Philips cassette, measuring about 3 by 2-1/2 by 1/2 inches. Although the unit will contain only about half as much tape as the standard Philips cassette, capacity will exceed 100,000 characters, the firm said.

'Quietizers' Cut Printer Noise

CITY OF INDUSTRY, Calif. – The Quietizers from Van San Corp. are a line of over 100 acoustical enclosures for line printers and other data processing and word-processing equipment.

The covers allow for normal operator access to the machine, the firm said.

A Quietizer for the Centronics 101A line printer costs $279.50 from the firm at 1180 Centre Drive, 91748.

Minn. County Saves $200,000

CPU Conversion Not Insuperable Task

By Patrick Ward
Of the CW Staff

ST. PAUL, Minn. – Converting from one vendor's mainframe to another's is not an insuperable task, especially when there is the incentive of major cost savings amounting to $200,000 annually, according to Robert L. Weber, DP director for Ramsey County.

Weber ought to know about conversion – he has personally been through the process six times. His latest effort involved converting 1,200 programs that had been written for an IBM 370/145 and a Univac 9400 to run on the Control Data Corp. (CDC) Cyber 72-14 that replaced them.

Conversion of some sort became necessary when Ramsey County's board of commissioners decided to combine the county welfare department's DP operation with the county's DP department.

The welfare department's 212K 370/145 had handled both batch and on-line applications, including warrant processing, stolen vehicles, traffic analysis and other law enforcement systems for the St. Paul police.

The 65K Univac 9400 at the county data center performed payroll and financial accounting, property taxation and mosquito control applications, Weber noted.

Growth Margin

The decision to consolidate "was a matter of economy," noted John T. Finley, commissioner of the Ramsey County board. The move reduced the county's monthly computer lease costs from $43,000 to $25,000 for a yearly savings of over $200,000, Weber said.

After deciding to go to one machine, the county figured the capacity needed for its current teleprocessing and batch work, added an estimate of capacity needed for system software overhead and allowed a 20% margin for growth.

IBM, Univac and Control Data all bid to supply the single machine, Weber said. IBM's plan called for the county to keep the welfare department's 370/145 as its sole computer, but the county felt the 370/145 lacked enough memory capacity, Weber explained.

Univac's bid was competitive, but CDC "met and exceeded every spec and was also the low bidder," Weber remarked.

The county estimated the conversion work would take six months but budgeted the task for eight months, "just in case" Weber said. Actual time turned out to be just under six months.

"We began doing conversion work at CDC sites around town long before removal of our computers here," Weber said. All the software changes were made and programs run prior to the release of the county's two computers.

The county used the final two months of the conversion effort to do parallel runs of all the application systems on its two machines against the converted systems on the Cyber 72.

Six months after first "setting pencil to paper on the conversion effort," the county released its 370 and in a few months later the 9400 was also gone, Weber recalled.

And the single computer showed that it could provide at least equal turnaround with a 20% margin for growth remaining, Weber said.

The Ramsey County computer center is currently providing both batch and on-line processing for social services, law enforcement, budget accounting, property tax accounting, payrolls and other county and City of St. Paul tasks.

If the county goes to further large applications, such as a planned system for municipal courts, it will probably use up the last of the mainframe's growth capacity and will have to turn to add-on memory to boost the system's capacity, Weber predicted.

Display terminals throughout the county tap the storage files of CDC's disks.

The St. Paul Police Department's visual display devices are on-line to the Ramsey County DP center.

Gould Printer/Plotter Resolves 200 Dot/In., 200 Char./Line

NEWTON, Mass. – An electrostatic printer/plotter, the 5200 from Gould, Inc., has a resolution of 200 dot/in. vertically and horizontally.

The 5200 unit was designed for applications requiring 0.2% accuracy in plotting graphics and permits greater image density and smoother curves, according to the firm.

For printing applications, the 5200 generates 132 char./line with fixed character spacing on 11-in. wide paper.

The 5200 also has the ability to generate variable spaced characters to permit ease of reading and allow over 200 char./line, the company added.

Both Helvelica Medium and Times Roman type fonts are available as standard. Other graphic arts fonts are available as options.

The 5200 prints alphanumeric data at 650 line/min and plots graphic material at 1.65 in./sec.

Provided with an eight-bit data path for input from the host computer, the unit comes with a 96-character Ascii, 16 by 16 dot matrix font with upper and lower cases. A 120 Ebcdic upper and lower font and a 128-character, 16 by 16 dot matrix font custom-designed to user requirements are optional.

Handling Capacity

Paper handling capacity is 1,000 sheets fanfolded or 400 feet of paper rolled on a 3-in. internal diameter core. A paper cutter also is available as an option.

Printing and plotting software packages and on-line/off-line hardware packages are available for most computer systems, the company said.

The 5200 is priced at $9,700 from the firm at 20 Ossipee Road, 02164.

Recurring Computer Nightmare #13

The day the Hampton Hills Schussklub arrived in Zurich.

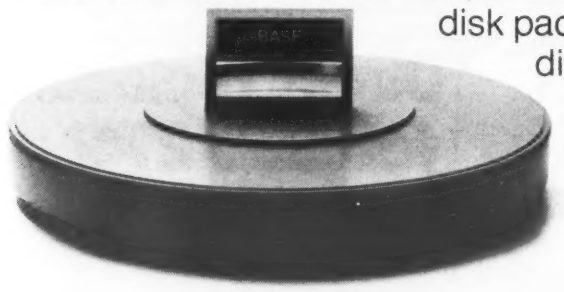
Just a simple reservations error or maybe a flaky disk, but when a bunch of hotdoggers ends up at an unexpected luau, your career could take a sudden downhill turn.

You could take a turn for the better, and cut your possibility of computer error down to a minimum. How? By specifying BASF the next time you order disk cartridges.

Our BASF 130 disk cartridge, for example, is engineered for Systems 3 applications. Actually, over-engineered . . . because there may be times when you need more performance than industry standards provide. Our coating methods are a case in point. We found that, with today's increasing packing densities, coating thickness becomes more and more critical. So we've discarded conventional coating methods in favor of an exclusive, close-tolerance process using our own BASF-designed equipment.

And we test. We do scratch tests to check coating thickness, impact tests to determine head crash resistance, detergent tests to check resistance to wear and temperature variations, and drop tests to make sure nothing goes out of whack during shipment. If anything unpleasant should happen, we'd much prefer it happen here than on your drive.

One more point. Our 130 costs no more than other Systems 3 disk cartridges. You're already paying for BASF quality . . . you might as well have it. For more information on the 130, or the BASF line of disk packs and flexible disks, write to BASF Systems, Crosby Drive, Bedford, Mass. 01730.



When it's BASF...you know it's not

the disk that goofed.

For Micr Processing

IBM 3890 Cuts Bank's Reject Rate 40%

PITTSBURGH, Pa. – Mellon Bank, one of the first users to install the IBM 3890 document processor, reported that after almost two months of operation reject rates were cut nearly 40% and the piggyback problem – two checks sticking together – has virtually disappeared. The bank also expects to reduce float by $1 million a day with the new reader/sorter.

Gilbert E. Arbuckle (left) and Joseph J. Utzig examine a tray of checks ready for processing on the 3890 reader/sorter at Mellon Bank.

Mellon Bank is in the process of upgrading its Micr processing system from four 360/30s and eight on-line 1419 magnetic ink character readers. The new configuration, which will be completed by mid-1975, will include two 370/135s, four 3890s and will use 3340 disk drives running under DOS/VS.

"We had just about reached a saturation point on volume and associated rejects with the Model 30s and 1419s," said Joseph J. Utzig Jr., vice-president and manager, central deposit and loan operations division. "When we looked at the 370/3890 configuration, all the technology and cost-effectiveness figures supported an upgrade to the new equipment as soon as possible. The Model 30s and 1419s have been our workhorses and we look for the 135s and the 3890s to play the same role.

"Because we are processing faster, we can obtain credit for checks drawn on other banks faster, which means millions of extra dollars may be available each day to earn interest," he added.

According to William J. Ward, assistant vice-president, research and development, who is responsible for design and implementation of the new check processing system, Mellon Bank's two 370/135s will be redundant, allowing for processing on either system from input from any of the 3890s.

If necessary, one 135 can support all four 3890s. Plans call for the new direct access storage devices to be shared by the two Micr-based 135s and three 370/168s in the bank's data center.

Gilbert E. Arbuckle, assistant vice-president and check processing manager, said Mellon Bank's overall prime pass reject rate with the 1419s has been 2.6%. During a recent seven day period in which more than 1.7 million items were processed through the 3890, the reject rate dropped to 1.6%.

"Most of those items were pre-encoded cash letters from our 800 correspondent banks," Arbuckle noted. "We expect the reject rate to go down even further as we process more representative groupings of Micr documents, such as inclearings and our own deposited items. Our expectation is to cut rejects in half."

With five additional pockets available on the 3890, Arbuckle expects to reduce secondary handlings of high-volume transit end points. He feels that where certain transmit programs currently require three levels of transit sorts, these can be reduced to two levels.

And, because Mellon Bank's 18-pocket reader/sorter is designed for continuous operation by one person, the bank also anticipates personnel savings.

D900 Has Dual-Array Density

CUPERTINO, Calif. – The Versatec D900 Series brings dual-array density and 200 dot/in. resolution to 8-1/2 in. wide paper electrostatic printers and plotters.

The dual-array writing head prints an overlapping dot pattern in a 16 by 16 matrix to produce character detail and denser print; the 200 dot/in. resolution effectively doubles resolution quality over earlier models, the firm said.

The new models include the Matric LP-D960 printer, Matrix D900 plotter and Matrix D900A printer plotter. All use raster scan, the Matrix Electrostatic Writing Technique and a stationary writing head carrying a dual array of 1,600 nibs, evenly spaced at 300/in.

The printer/plotter operates in three modes: print, plot and optional simultaneous print/plot.

Operating in print mode, the units print 600 line/min with 100 column/line and 12-1/2 char./in. across 8-1/2-in. wide paper. Vertically, they space 8 line/in. down 84 standard lines per 11-in. page. Both use a 96- or 128-character Ascii set.

Units with plotting capability plot at 1.25 in./sec in paper drive increments of .005 in. Plotting width is 8 in. across 8-1/2 in. wide paper.

Printers and printer/plotters accept Ascii signal input, parallel and serial.

The Matrix LP-D960 printer is priced at $6,700; Matrix D900 plotter, $7,800; and Matrix D900A printer/plotter, $8,900.

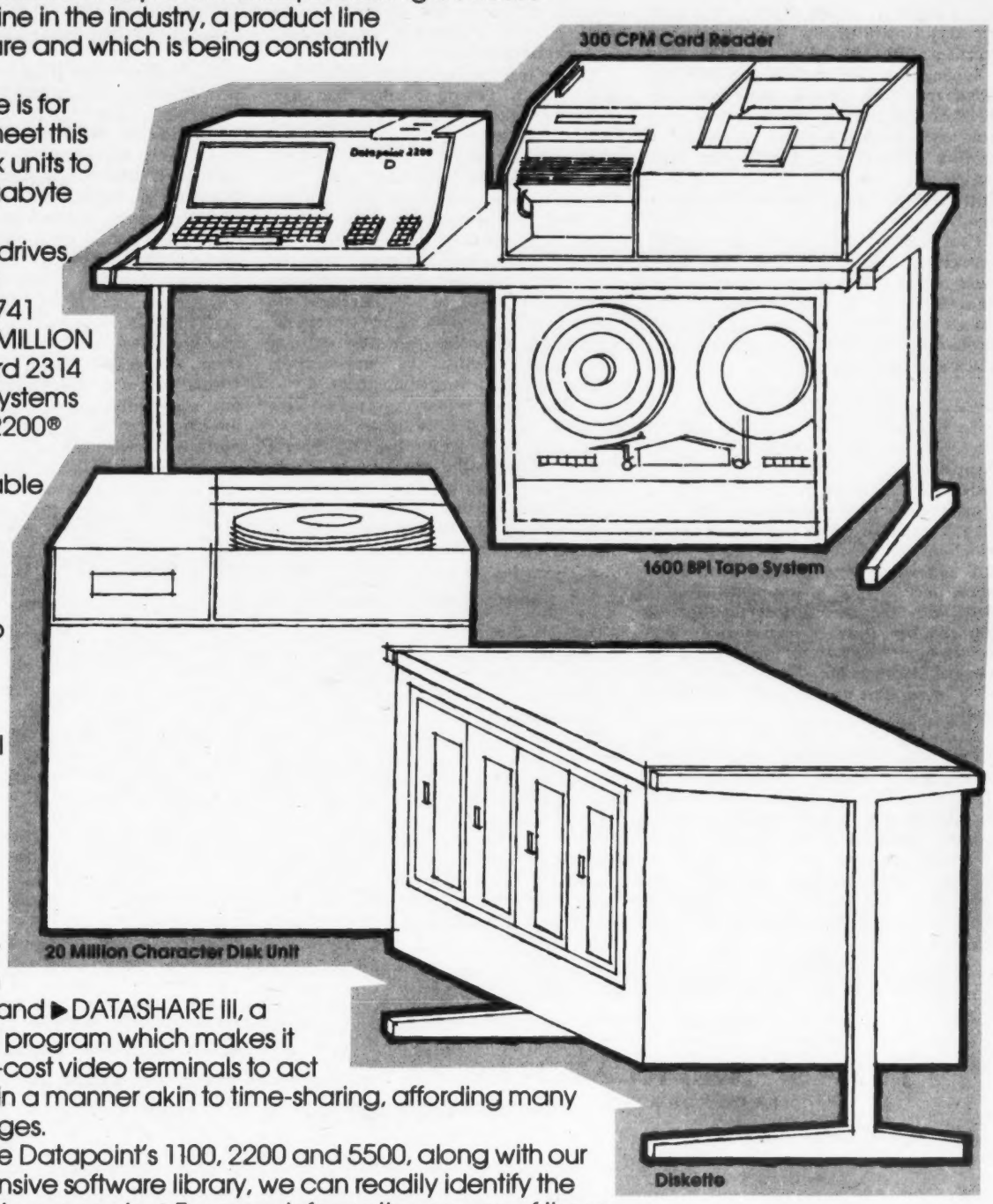
Versatec is at 10100 Bubb Road, 95014.

More good reasons for Datapoint leadership in dispersed data processing

Datapoint Corporation continues as the leader in dispersed data processing because we offer the best and broadest product line in the industry, a product line incorporating both hardware and software and which is being constantly expanded and improved.

Hardware—the user requirement here is for increased mass memory capability. To meet this need Datapoint has added two new disk units to complement its well established 2.4 megabyte cartridge disk system. They are: ▶ A new DISKETTE memory with up to four diskette drives, each offering over 256,000 characters of storage and interchangeable with IBM 3741 diskettes; and ▶ a new high capacity 20 MILLION CHARACTER DISK which utilizes a standard 2314 type disk pack. These new disk memory systems may be employed with either Datapoint 2200® or 5500 processors.

In addition, Datapoint is making available ▶ a new industry-compatible 1600 BPI 9-CHANNEL MAGNETIC TAPE SYSTEM to meet the need for high density bulk data storage, and ▶ a new 300 CPM CARD READER for remote batch and remote job entry applications.



Software—another major factor in Datapoint's leadership in making dispersed data processing a commercial reality has been our emphasis on, and success at, creating user-oriented operating software and programming languages. Recent additions to Datapoint's extensive software library include ▶ a DISK-BASED DATAFORM LANGUAGE for use in intelligent data entry applications; ▶ the RPG II LANGUAGE with Index Sequential Access Method (ISAM), and ▶ DATASHARE III, a new version of the Datapoint 2200 control program which makes it possible for as many as eight remote, low-cost video terminals to act and function as 2200 terminal processors in a manner akin to time-sharing, affording many operating economies and other advantages.

With our trio of dispersed processors, the Datapoint's 1100, 2200 and 5500, along with our expanding family of peripherals and extensive software library, we can readily identify the reasons for our leadership in dispersed data processing. For more information on any of these new products, and on Datapoint's total family of dispersed processing systems and peripherals, contact the sales office nearest you or write or call Datapoint Corporation, Attn: Marketing Administrator, San Antonio, Texas 78284, (512) 690-7173.

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Miniworld

Dedicated Minis—Part 1

Two Banks Tackle Problem Of Daily Ledger Accounting

By Vic Farmer
Of the CW Staff

When it comes to needing up-to-date information quickly, bankers stand without parallel. A wrong decision can have repercussions instantly translatable into stacks of $100 bills "down the drain."

Solving the information gap problem, however, is no easy task. More and more bankers are turning to dedicated minicomputer-based systems to provide information instead of trying to add interactive communications or batch applications to their already overburdened mainframes.

Four banks spread across the country recently tackled their information problems successfully with small systems from four different vendors. Of the four, two banks zeroed in on their daily ledger accounting by selecting equipment from NCR and Data General.

Happiness Is . . .

To the managers, trustees and auditors of South Boston Savings Bank in Boston, happiness is a computerized general ledger system that is streamlining the bank's accounting procedures while cutting bookkeeping preparation time by as much as 80%.

A 24K-word Data General Nova 1220 minicomputer links operating department data with the bank's general ledger to immediately provide management with daily, month-to-date or year-to-date financial information. The system has two disk drives, line printer and a CRT terminal.

According to South Boston Savings Comptroller Robert Lee, "the computer's ability to get quick performance reports from the general ledger files, or "batches" of data, is particularly helpful in compiling the kind of accounting information we often need to guide cash allocation policies. Also, the new efficiency of the general ledger system now enables the bank to issue monthly earnings estimates to its trustees, rather than the quarterly statements issued before we got the computer."

And when the time comes for the bank to open its records for the next annual audit, all the information the auditors need will be on-line.

"At the time of last year's audit," Lee said, "South Boston Savings had just opened its first branch office and was growing rapidly.

"Because of this turmoil, the audit took twice as long at twice the price. This experience was a big factor in convincing the bank that it should put the general ledger on a computer."

South Boston Savings worked with the Viehmann Corp., consultants in financial information systems, to develop the system. All programs were written in Fortran IV but were completely customized to be operated by bank staffers without previous computer exposure.

As data is entered through the CRT terminal the system validates each account number and then displays the account name for the operator to check. Posting the previous day's ledger transactions manually used to take from two to seven hours of a bookkeeper's time but now consumes between 40 and 90 minutes.

Another 'Small' Approach

The Northwestern/St. Paul National Bank in St. Paul, Minn., approached its need for more timely general ledger information in a different way, but still with a small system – an NCR 399.

"We were doing the job manually, and we just weren't able to extract enough information in a timely fashion," according to Harold W. Wachs, vice-president and controller.

"In theory, considering the data processing configuration we have, there should have been no problem. But reality is something else. To use the large computer system you have to stand your turn in line behind other computer users who have deadlines of their own."

Posting credits and debits, the minicomputer operator at Northwestern/St. Paul National Bank updates magnetically striped ledger cards.

The bank solved its problem with the installation of the NCR 399 minicomputer. This proved ideal, he explained, because it utilizes magnetically striped ledger cards encoded with historic information such as planned goals for given account balances at specific points in time.

Uses Cassettes

Of equal importance, the machine can read programs into its central processor from tape cassettes and can record the results of computations in the same medium. The latter capability permits the minicomputer to prepare summary reports in the desired formats.

Northwestern/St. Paul has 500 general ledger accounts, Wachs said. As with its old hand-posting system, input data is received from the various departments as summaries of the daily activity. Data is imprinted on the face of the card and encoded in the stripe on the back.

In response to program commands, the processor updates the accumulated totals for the period to date and computes the average balance for all accounts. In turn, these are compared on a printout to the planned average balances.

"Under our old system, we only had the time to do this comparison for a few selected accounts," he said.

"Since we are buying funds heavily in many areas and need precise data for managing our margins, selected information wasn't very helpful. Comparing with the same period last year is meaningless.

"We're concerned with the sources of funds and their uses. But you've got to be able to see the whole picture," he asserted.

Daily Lists

For both assets and liabilities, the bank's officers are receiving daily listings of year-to-date balances contrasted with the planned figures for the month. A daily statement of condition also lists detail totals for each type of loan and amounts due from affiliates and other domestic and foreign banks, plus fixed assets. The undivided profits report shows amounts and percents for the current month and for the year-to-date.

Besides providing needed information in a timely fashion, Wachs said, the minicomputer represents what he described as a buffer against inexperience and turnover. This is because the machine monitors operator performance, requiring adherence to a predetermined processing discipline, he said.

Part II will cover two banks using small systems to keep track of account statistics.

Unit Provides Interface Between Hytype, Unibus

BEDFORD, Mass. – The Model 1210 printer control from Bedford Computer Systems, Inc. provides a parallel interface between a Diablo Hytype printer and the Unibus of any Digital Equipment Corp. PDP-11 computer.

The interface will support both printing and plotting tasks, Bedford said. Full upper- and lower-case Ascii printing is permitted at data rates up to 30 char./sec.

The printer control consists of three modules plus an interface cable. The modules plug directly into a "small peripheral slot" in the computer, the vendor said.

Parallel interfaces between the Diablo printer and other minicomputers will be announced shortly. The Unibus interface costs $850 from the firm at 3 Preston Court, 01730.

Caelus Exercises Disks

CUPERTINO, Calif. – Users can check out their Caelus Series 100, 200 and 300 disk drives, as well as similar drives from Wangco, Pertec, Diablo and Iomec, with an exerciser from AVA Instrumentation.

The unit is priced under $300 from the firm at 10234 Parkwood Drive, 95014.

Mag-Cards Use Both Sides

GRAHAM, Texas – The double-sided Mag-Card from Graham Magnetics, Inc. offers 100% more word processing recording capacity than the firm's single-sided Mag-Card for a 50% higher price, Graham said. Both Mag-Cards are compatible with IBM Selectric typewriter equipment.

The double-sided Mag-Card has a magnetic coating which contains built-in lubricants, so there is no need to devote a side solely to lubricating purposes, like the graphite surface on one side of other magnetic cards, a spokesman said.

A box of 25 double-sided Mag-Cards costs $37.50 compared with the $25 price of the single-sided version. The cards are available from Graham, Department W, 76046.

Disk Equipment Released For Wang's System 2200

TEWKSBURY, Mass. – Two alternatives for disk users have been released by Wang Laboratories: the Model 2260 fixed/removable disk drive, which can provide the company's System 2200 minicomputer with up to 10M bytes of disk storage, and the Model 2224 disk multiplexer, which allows four 2200 CPUs to share a single disk drive.

The 2260 disk drive's total storage is equally divided between a pair of disk platters, one fixed and one removable. File maintenance is handled by automatic file cataloging when saving or loading programs or data files by name or by absolute sector addressing, which permits specific sectors on the disk to be addressed.

The 2224 disk multiplexer, operating with any 2000 disk, automatically polls each 2200 in sequence. It can also be locked into communication with one CPU.

The 2260 disk drive costs $16,500, and the 2224 disk multiplexer costs $2,000 from the firm at 836 North St., 01876.

Minis in Business—Part 1

Flexibility of Technologies Allows Range of Configurations

By Theodore A. Franks
Special to Computerworld

Minicomputer technology has evolved to a point where substantial performance is available at nominal cost. Once one considers the possibility of developing custom minicomputer-based systems, configuration variations far beyond those provided to traditional business data processing users by the large mainframe suppliers are readily available.

These variations include quantity and type of associated peripherals, redundant facilities to provide fail-soft operations, multiprocessor configurations and support of unique devices.

Traditionally, business data processing can be characterized by concern with input/output operations. Modern business requires rapid access to large volumes of data upon which relatively simple processing algorithms are executed. Functions such as searching, updating, inquiry, sorting and extraction for purposes of billing, inventory control, payroll, etc. imply tremendous I/O activity. Accordingly, business data processing tends to be I/O bound.

Because of this dependence on peripheral device speeds, business data processing needs have generally driven peripheral development progress. Size, speed and costs have improved continuously to today's standards of 200M-byte disk drives, multibillion-byte files and 230.4 kbit/sec communications channels.

Multiprogramming Promoted

As data processing technology has advanced, so have the complexities of the operating systems. In order to increase system throughput, particularly since the CPU is rarely 100% utilized, multiprogramming of several different job streams has been promoted.

However, this additional capability does not come free. The overhead of these operating systems appears to have solved the problem of the underutilized CPU.

The operating system complexity is such that very senior programming talent is required to support program developments. Individual programmers lose touch with the hardware and various degrees of inefficiency creep in.

Further, the complexity of the resultant operating system and application packages often require protracted and costly debugging cycles. Support of existing programs is a significant level of effort.

The term "distributed data processing power" represents evolution of the same technologies as have spawned the minicomputer itself. Minis are simply a part of the emerging hierarchy of CPU power. There is little difference between the processing element in an intelligent peripheral subsystem or front end and a traditional minicomputer itself.

It is now obvious that any peripheral offered on a large system can (and often has) been interfaced to a minicomputer. Information regarding the hardware and software interfaces of both minicomputer and peripheral are known and well within the reach of many companies to wed together.

The latest peripheral technology is available in a minicomputer data processing system by anyone desirous of the combination, and a specific new device or combination of state-of-the-art devices can be offered as required – not just whenever the large mainframe supplier decides to support them.

Since the software which ties the hardware together in any application is under user control, adaptation to specific requirements is obvious. The user dictates form, fit and function to satisfy his needs – not just what a large system supplier thinks is appropriate for his universe of customers.

Of course, this flexibility comes at a price. The final burden of software development rests with the user. However, minicomputer makers do offer a reasonable range of software operating systems of significant assistance.

An obvious application is in off-loading rote I/O operations. Frequently print output data is spooled out to tape or disk files for subsequent execution as a background task. These same files could be removed from the system entirely and handled by an off-line mini-based system. Similarly input files could be put on tapes or disks for subsequent processing by the large host system.

Often data processing sites contain equipment of mixed origins. In order to interchange information among these varied systems, a need exists to convert from one media to another. This conversion frequently involves code conversions and special labeling considerations. An off-line minicomputer system with appropriate peripherals and conversion software can easily accommodate this need.

Minicomputer systems are natural candidates for operating unusual or special peripheral devices such as magnetic ink/optical character readers, computer output microfilmers or graphic/text editing terminals to name a few. In the process of supporting these devices with an intelligent off-line system, functions such as editing, preprocessing, batching of data, validity checking and statistical summarizing are readily accommodated.

Use of minis as communications front-end processors has already been well established and is another example of the same trends.

Recently, at least two organizations have been involved with placing data base management functions on either a back-end minicomputer or stand-alone system. The back-end mini accepts commands from a large host system, accesses a data base configured on the mini and returns results. The advantages cited include data security, reliability through configuration flexibilities, efficiency by specialization and the economy of off-loading the large host system.

Finally, minis can be considered as one level of the processing hierarchy in a large system. Specifically minis can be configured as intelligent peripheral controllers. In this role the added level of intelligence allows for interpretation of I/O channel commands, buffering peripheral data rates to match channel capacity and handling error control.

In Part 2 considerations related to planning mini-based applications will be covered.

Franks is a vice-president at Formation, Inc.

Miniworld

Via Magnetically Striped Cards

Ohio Turnpike Tallies Toll Information

By Catherine Arnst
Of the CW Staff

CLEVELAND – The Ohio Turnpike's 18-year-old toll audit system was retired recently for one using magnetically encoded toll tickets with a high tolerance for damage.

The previous system, installed by IBM in 1956, issued punched cards to motorists. To be read, each card had to retain its exact dimensions, a condition difficult to maintain while the cards were in the hands of the traveling public. They were frequently mutilated or affected by humidity, requiring the data to be manually transcribed.

The new Daily Electronic Toll Lane Audit (Delta) system developed by Electron, Inc. uses a ticket with magnetic ink printed in a 1/2-in. strip across its face. The amount of data recorded is 15 times greater than with the punched cards and includes weight, distance traveled and a detailed description of the vehicle.

One desired result of the new cards is reduction of fraud. The turnpike carried 24 million vehicles in 1973 and, although no figures exist, officials assume there is substantial revenue lost through both patron and collector fraud. The more detailed cards should prevent such common fraudulent practices as ticket switching, officials feel.

The turnpike commission decided a new system was required in 1971. By then, maintenance of the old one had become a major problem, as IBM had stopped making parts and servicing it seven years after installation.

A very specialized system was required for the turnpike's unusual method of charging vehicles on the basis of weight rather than number of axles, as on most toll roads.

There are nine standard weight classes and several additional special classes which further complicated the system.

One of the major reasons for choosing Delta was its easy maintenance. All units in the system are completely portable, so that when a breakdown occurs anyone at the site can fix it by unplugging the defective unit and replacing it with a spare.

Delta consists of a terminal in each of the turnpike's 86 exit and entry lanes, a dual Digital Equipment Corp. PDP-11/05 at the 17 plazas and a host dual PDP-11/05 located at management headquarters.

The terminals feature alphanumeric displays which communicate information to the toll booth attendant and toll charges to the motorist. There is a 12-key keyboard to enter variable data, an 18-key keyboard to identify exceptions such as lost tickets and a special function button for high frequency situations such as passenger cars.

The duplexed computers at each plaza operate in a master-slave relationship, although the roles are interchangeable. If communications should fail with the host computer, they have the ability to store several days' transactions.

As data is entered at the terminals, it is gathered by the plaza computers and then polled by the host on a continuous basis, where it's stored for auditing purposes.

Each toll booth must be audited daily to determine accurate cash positions and evaluate collector performance. Previously, data could take up to four weeks to compile, and the punched cards went through 13 separate processes.

With Delta, the cards are handled only twice, at the entry and exit of the motorist, and data can be processed and made available within 12 hours after a collector goes off duty.

Talbot Harding, director of information for the turnpike, expressed satisfaction with the system, stating that collectors are adjusting very quickly and no real problems are foreseen.

Savings in maintenance of the $2.85 million system, and the lowered incidence of fraud, are expected to cover the cost before 1981, when the road becomes toll free.

Sample of Cards Used in Ohio Turnpike Toll Information System

Unregistered Autos May Register Regret

BERWYN, Ill. – A vigilant computer could reap this city thousands of dollars – to the regret of about 3,000 citizens.

When computers at nearby Morton College were used to compare tapes containing the number of registered vehicles with a list of vehicles with city stickers to determine how many residents had not bought them, there appeared to be about 3,000 discrepancies, indicating that over 8% of Berwyn's 25,000 car owners had not yet purchased vehicle tags.

Data Entry the 'Neglected Child' of Systems Analysts

By Nancy French
Of the CW Staff

SAN DIEGO – Now that systems analysts have concentrated on assuring maximum efficiency in CPU operations, it's time they put their talent to work on the problems in data entry and data collection, according to Peter Zinsli.

Speaking at a recent conference, Zinsli of Computer Machinery Corp. explained that data collection methods developed back in the '50s were actually more efficient and cost-effective.

"Efficiency experts running around with their clipboards and time and motion studies made it so," he said.

In recent years, however, the systems analysts' efforts have been devoted to increasing the efficiency of the computer system itself, and the data entry function has been largely neglected, he explained.

"Literally no systems work has been done in the end-user departments on what it costs to generate data," Zinsli said.

"Data entry represents 30% of the cost of data processing," and 10% to 20% of that cost could be saved with no change in equipment, simply by having systems analysts verify how the system is actually working, he said.

"There is a tremendous amount of inertia in the marketplace. Vendors have made available equipment with no record length limitations, for example, but even users of that equipment are reluctant to take advantage of these improvements. They don't want to change," he noted.

'Field Data Entry'

Great improvements can be achieved by placing responsibility for data entry in the hands of the persons who generate the information rather than bringing in a keypunching middleman, according to Howard Merowit of MSI.

Merowit predicted that we are moving toward a system when data entry responsibility will become an additional duty by persons whose main function is something else.

This "field data entry" concept would be supported by portable terminals used to record data at the site and then transmit to the computer over voice-grade lines.

Merowit cited as an existing example of "field data entry" the point-of-sale terminal where data is collected as a by-product of cash transactions. Although not portable, the clerk can be collecting data at a remote site for processing later, he said.

Distributing data collection and data processing closer to the user with the need to know was also addressed by William Luther of Scan-Data.

"Whether we are talking about OCR systems, key-to-disk systems, mixed media systems, remote batch terminals, intelligent terminals, utility processors or application-based minicomputer systems, we are breathing more intelligence into each of these nodes of the information producing network," he said.

Future Techniques?

About future modes of data entry, Luther predicted the industry is a "decade away from efficient handprint optical character recognition, and controlled voice data entry will not be perfected before the early 80s."

Experiments to date show that machines can be taught to read handprinting "but not just anybody's," he said.

"For example, IBM took samples of 1,000 people's handprinting at the 1964 World's Fair in New York and, based on that, installed about a dozen 1287 OCR document reading devices.

"Unfortunately," he said, "the equipment had to be replaced because none of the employees at the companies where the equipment was installed had been sampled at the World's Fair," he quipped.

"These machines are getting into heuristics – the machines must learn as they go along," he explained.

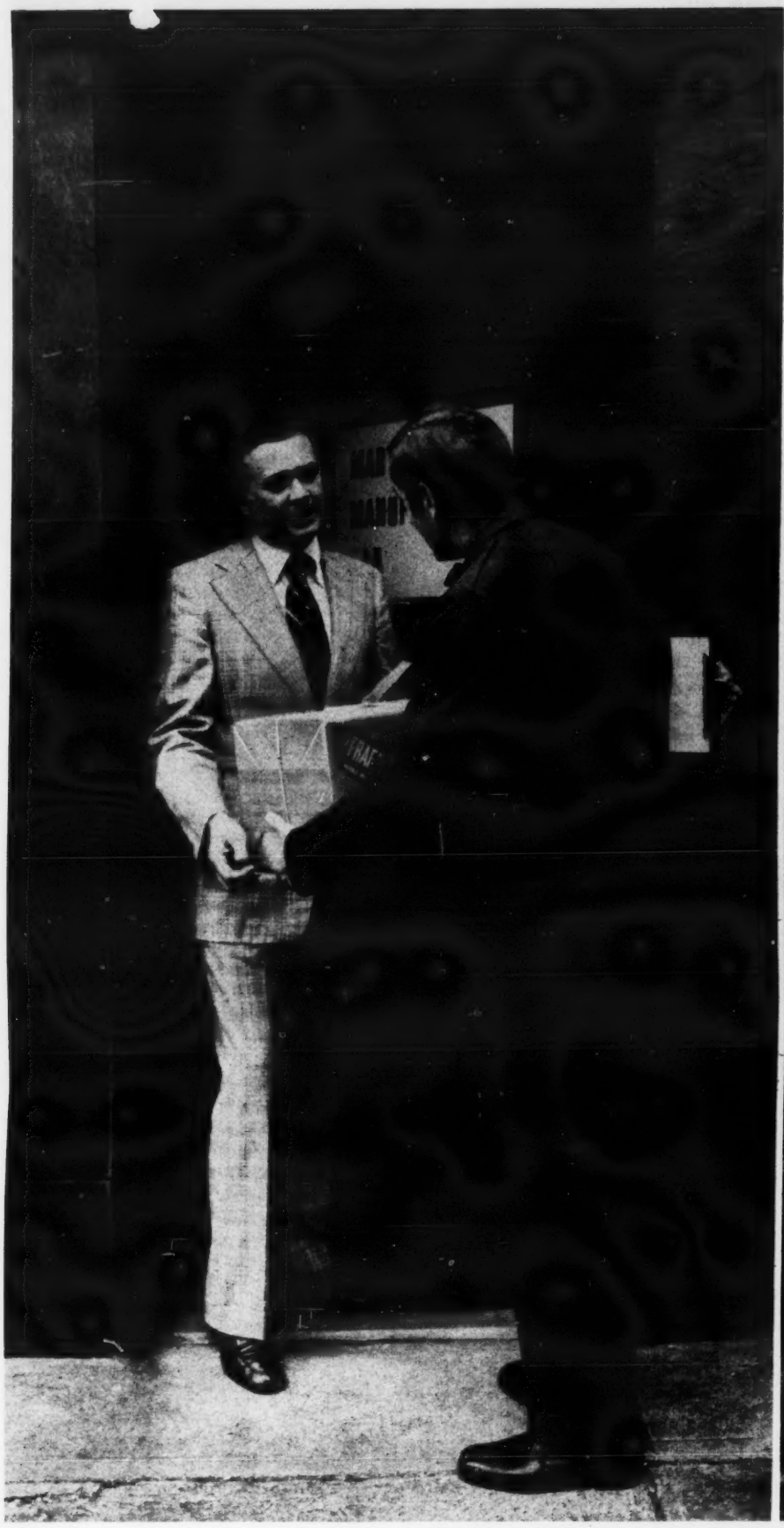
A voice data entry baggage handling experiment at Chicago's O'Hare International Airport is another illustration of this problem, Luther pointed out.

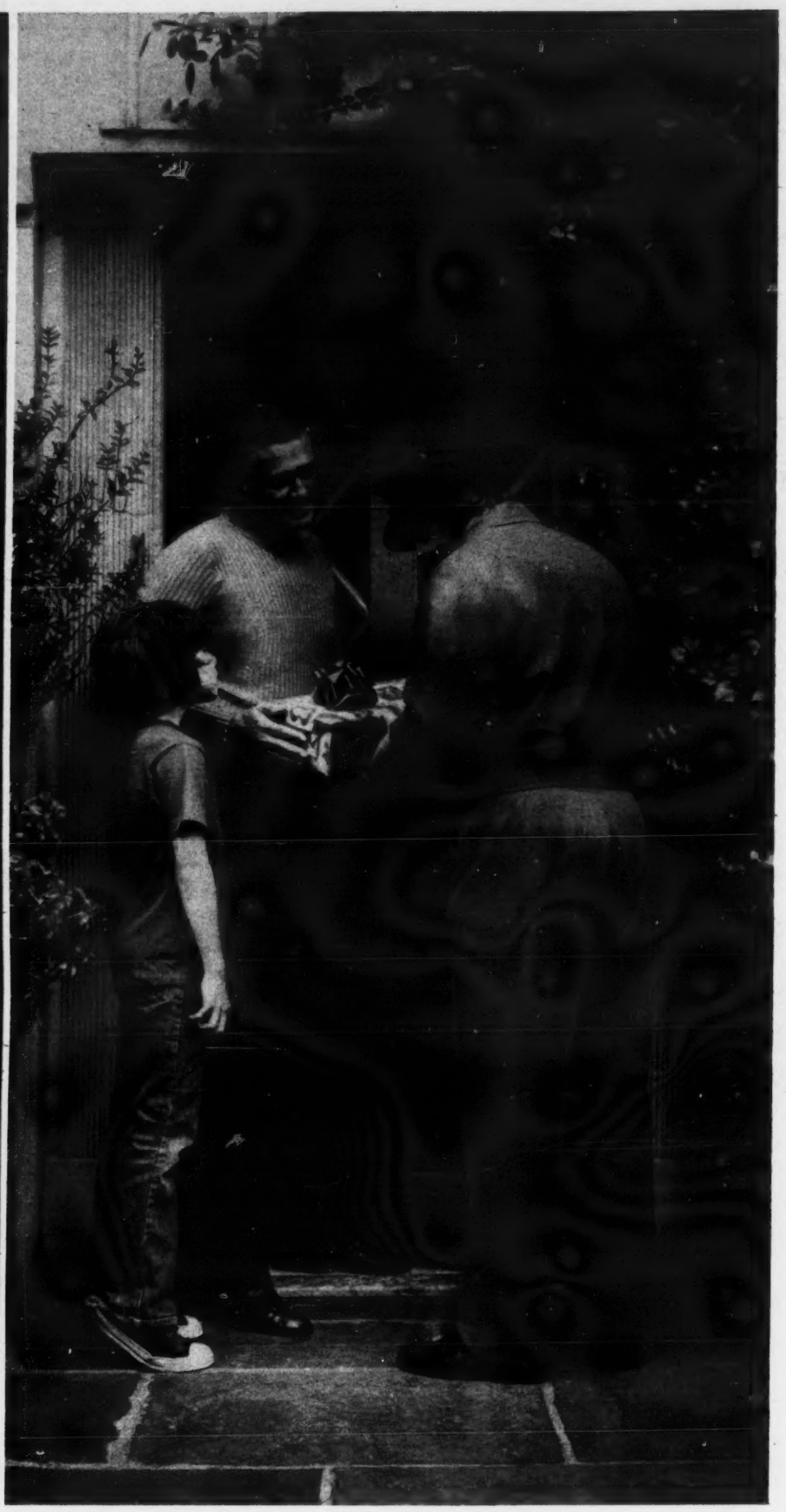
The system, based on a limited vocabulary of words and numbers, is geared to one person's voice.

"If the baggage handler has a cold, he has to reeducate the machine," Luther explained.

Panelists agreed that voice recognition has a low priority because it can't meet the speed criterion for data entry.

Data entry via push button telephone with a double check voice response to verify promises to be one of the quickest and most efficient systems, the panelists agreed.





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COMPUTER INDUSTRY

CI Notes

Reading EKGs a DP Market

NEW YORK – The market for computer-aided interpretation of electrocardiograms will require the installation of computer systems worth $220 million and peripherals valued at $135 million before 1980, according to a study by Frost & Sullivan, Inc.

The value of supplies, maintenance and related services will approach $40 million annually, the study said.

Data 100 Finds Financing

MINNEAPOLIS – Data 100 Corp., maker of remote batch equipment, has negotiated preliminary agreements with Associates Capital Co., Inc. and CFSC Leasing Corp. for financing $15 million in lease proceeds.

Associates Capital has agreed to finance up to $10 million, while CFSC's agreement calls for $5 million over the next six months with a possible additional $10 million during the balance of 1975.

Both firms will pay Data 100 cash and will receive monthly proceeds from existing and future Data 100 extended term leases.

Ampex Sues Memorex on Patent

SAN FRANCISCO – Ampex Corp. has filed a patent infringement suit against Memorex Corp. asking for a preliminary injunction against Memorex and charging Memorex with using a tape binder formulation invented by Lawrence Graubart in violation of the patent.

"We think that the present suit is based on an invalid patent," a Memorex spokesman said. "We also think this suit covers essentially the same formulation for which we paid $100,000 in 1966 and we have no intention of paying twice for the same thing."

Honeywell Plans No Exit

WALTHAM, Mass. – Honeywell, Inc. last week denied reports in foreign press that it would terminate its computer operations Dec. 6.

Supershorts

IBM has donated $200,000 to Drexel University in support of faculty development.

– – –

California Computer Products, Inc. (Calcomp) has signed a one-year contract to supply 1,500 Calcomp 140 floppy disk drives to Computer Automation, Inc. for use with the LSI series of Naked Mini.

– – –

Orbis Systems, Inc. said it has received OEM orders for more than 8,500 diskette drives.

Outlook Good for '75

Minimakers See Trend to Larger Memory

By Molly Upton
Of the CW Staff

Although in many instances minicomputer systems are selling for less than they were two years ago, users are generally paying the same ticket price or more and receiving more memory and disk capacity, interviews with several minimakers revealed.

The amount customers spend on a typical minicomputer system has remained relatively steady, "but they're getting a heck of a lot more for the same amount of money," commented Bill Rosser, director of marketing for Interdata.

"It's almost as if they get into a certain capital budgeting loop within their company that allows them to spend that kind of money without too much trouble," he said.

Costs of memories are decreasing, and users are willing to buy more memory in order to avoid the programming expense of working to compact codes, he noted.

Another factor contributing to larger memory sizes is the increased complexity of some operating systems, Rosser added. Some of them now take up 48K bytes.

In the OEM arena, he said, customers frequently initially buy 16K or 24K for development with the idea of compacting codes. However, generally they add more bells and whistles to the system rather than cutting the size and cost, Rosser said.

Typical demand for an Interdata system in 1972 was for about 12K of memory, in '73 about 16K and in 1974 it was over 24K, Rosser said.

At Modular Computer Systems, typical orders in 1972 were for minis with around 24K of memory. This has doubled to 48K for the Mod II in 1974, said Ray Marlatt, director of sales.

At Microdata, which sells to OEM customers, recent orders have shown a 20% to 25% increase in memory size over orders initiated a couple of years ago, said Phil Cleveland, vice-president of marketing. Most systems are around 16K, but some are up to 24K, he said.

However, continuing OEM orders are for the same configuration since the applications are relatively fixed, he said.

Cleveland explained that Microdata's OEMs usually use machine language, which helps reduce need for larger memory sizes.

Emphasis on Disks

All agreed there is more emphasis on larger disks. Interdata has seen orders for disks go from 2.5M bytes to 10M bytes and expects to offer a 40M-byte unit soon, Rosser said.

Marlatt observed, "In 1971, you had to really jump up and down to sell the guy a disk. By 1972, nearly everything was going out of here with Diablo disks. Today, you find not only the Diablos but the large ISS 2314-type multiple platter disk and a lot of pressure for the 3330-type 100M-byte disk.

"There is also a fair amount of emphasis on the fixed-head disk in the measurement control market," Marlatt said. "Even in communications they'll put in fixed-head disks.

"Now we're seeing floppy disks instead of paper tape and a heavy orientation toward terminals instead of printers," he continued.

In the future, Marlatt sees a demand to supply a bulk memory system that could be addressed as if it were a peripheral.

Modcomp cited increased demand for character printers as replacement for teletypewriters.

But the prospect of reduced memory costs could be only temporary, warned Cleveland of Microdata. Although core memory costs have gone down in the short term, he said he expected them to increase.

Prospects for 1975 are looking at least as good as last year, the minimakers said. Interdata's backlog rose in the last quarter. "We're wondering if we're not seeing something . . . We're optimistic but are being very observant," Rosser said.

No 'Nose Dive'

Cleveland said he expects '75 to hold static, although the first calendar quarter should be a little better than expected. "It doesn't look like the market will take a nose dive," he added.

Microdata, he continued, has tried to pick OEM customers that are not affected so much during hard times, and the small business market seems to be growing.

Modcomp sells to companies that have money to spend on either upgrading or automating plants, Marlatt said.

With process control, computers frequently can be justified within a year, he noted.

Japanese Government Planning To Protect 50% Market Share

TOKYO – Measures to retain 50% of the Japanese market for domestic DP manufacturers after next year's planned liberalization of computer imports into this country have been published in a draft by the information industry committee of the Ministry of International Trade and Industry's (Miti) Industrial Structural Council.

Although the draft did not go into detail, it mentioned a move to curb the activities of foreign capitalized companies, especially IBM, in order to create conditions for fair competition after liberalization, according to *EDP Japan Report* (EDP/JR).

'Administrative Guidance'

In addition, the draft cited the need for "administrative guidance," urging continuation of the policy of "encouraging the use of domestic products" for government offices and public agencies.

Acknowledging that foreign machines now have almost a 50% market share in terms of value of installed machines, the draft stated: "Should the market share of domestic machines go down steeply after the trade liberalization, the invocation of the safety clause of Article 19 of the Gatt [an international trade agreement] and the imposition of an emergency tariff should be examined . . . "

Cooperate With Government

The draft suggested the government should ask the foreign capital companies operating in Japan to align themselves with the Japanese economy, and all business operating in Japan should be asked to further cooperate with goverment measures, according to EDP/JR.

In efforts to become systems makers industry, the document emphasized the need for both specialization among firms and expansion of offerings to encompass a series of systems rather than isolated machines.

The draft mentioned the need for further strengthening of cooperative relationships in production and marketing areas, but it noted that another regrouping of the principal companies would not be adequate.

Cooperative relations between makers of minis and "midget" computers is also desirable, it said.

Maximize Assets

In efforts to become systems makers rather than producers of individual machines, firms should maximize their capabilities as manufacturers of communication equipment and overall manufacturers of electric machinery and appliances, according to EDP/JR.

In order to compete with the expected FS from IBM "it is important to establish basic technologies in the fields of pattern recognition, integrated circuits, large capacity files and high reliability," the draft said.

Firms developing software should specialize and strive for lowering production costs and for mass sales, the draft indicated.

Unbundling Requested

USC Injunction Against Univac Denied

PHILADELPHIA – Judge Clifford Scott Green denied the petition for a preliminary injunction brought by United Software Corp. against Univac.

USC had sought to either enjoin Univac from issuing Level 32, Release 1 of an Ansi tape labeling package for use on the Univac 1100 Series or to have Univac charge separately for the product [CW, Oct. 30, Nov. 20].

Previously, Univac has supplied a non-Ansi standard tape labeler as part of its bundled software. USC's principal product is a tape labeler system that conforms to Ansi standards.

Green found that a preliminary injunction was inappropriate as there was only "very slight evidence of a possibility of irreparable harm" and there were "significant questions raising substantial doubt as to the probability of plaintiff's success on the merits."

Same Injury

Green observed that USC would suffer the same injury "as it does now, even if, although the operating system was unbundled from hardware, the operating system was independently offered as a unit, and the elements which make it up were not unbundled.

"There is no substantial dispute that the tape labeling program functionally belongs in the operating system of the 1100 Series," he continued.

He noted "there are substantial doubts as to whether the tape labeling program and "the Executive" are separate products, and even if they are, whether the sale of them as a bundle is unlawful."

DPF Settles Securities Suit

HARTSDALE, N.Y. – Lessor DPF, Inc. has agreed to settle a pending class action suit against it brought on behalf of purchasers of the firm's securities between May 31, 1969 and Sept. 24, 1970.

The out-of-court settlement, which is subject to court approval, will cost the firm $1.8 million. Total payments by certain defendants, which includes all expenses of the settlement, amount to $2.85 million, the firm said.

The suit held that the defendants had published financial statements during that period which contained alleged misstatements about the firm's financial condition, earnings and earnings prospects.

Since then, DPF has replaced its top management and all but one of its directors.

In agreeing to the settlement, the defendants denied any wrongdoing or liability. However, the settlement was thought to be in the best interests of all to avoid the ongoing expenses as well as the uncertainties and involvement of time and effort of lengthy litigation, a DPF spokesman said.

Calcomp Gives Plotters To Minority Course

ANAHEIM, Calif. – California Computer Products, Inc. (Calcomp) has donated two complete drum plotting systems and accessories worth $160,000 to Pepperdine University and the Telco Institute of Urban Technology as part of the schools' college course to train minority students in computer technology [CW, Sept. 11].

The two Calcomp drum plotting systems will be used as part of this course to train about 40 minority students.

Special Course

Under a grant from the Department of Health, Education and Welfare, Pepperdine – in association with Telco, a private training institution in southcentral Los Angeles – has for the last four years conducted a special two-year course leading to associate of arts degrees in computer programming/systems analysis and computer maintenance.

Contracts

Intel Corp. has signed an OEM contract with Remex, a unit of Ex-Cell-O Corp., for a large volume delivery of the Remex RRF 7200 fanfold reader to be used with the Intellec microcomputer development systems.

American Totalisator, a subsidiary of General Instrument Corp., will design and construct Connecticut's off-track betting system, Teletrack. The system will include a computerized telephone wagering system and televised closed-circuit viewing of races on New York State tracks.

The Naval Electronic Systems Command has awarded System Industries a contract for minicomputer disk storage systems for use in ship-to-satellite-to-shore communications.

Librascope Division of the Singer Co. has been awarded a contract by the U.S. Army Electronics Command, Electronic Systems Procurement Branch, for development of a multipurpose data processing, message handling and communication integration system for Army field use.

Beehive Medical Electronics, Inc. has signed a two-year contract to supply CRT terminals to the Ohio College Library Center to be used in an on-line automated library network.

The New Jersey Turnpike Authority has contracted AGS Computers, Inc. for the turnkey development of a minicomputer-based toll data system.

Kennedy Co. has received a contract for Series 9000 tape transports from Data Pathing, Inc.

EM&M Taking Precautions Despite Strong Backlog

By Nancy French
Of the CW Staff

HAWTHORNE, Calif. – Electronic Memories and Magnetics' (EM&M) Data Products Division, which specializes in ways to enhance systems such as the IBM 370/155, the 360/65 and System/3 Model 10, is projecting a good year because "users aren't going to be so quick to upgrade," Tony Capolla, director of sales, said in a recent interview.

Despite the apparent recession "our backlog is very strong and, quite frankly, we're confused," added Edward Farris, EM&M's corporate vice-president.

"Everybody's planning for a fall-off in business," he said, and like a self-fulfilling prophecy "we may just make sure it happens."

While the company has already streamlined its San Jose manufacturing facility with a layoff some months ago, the only major precaution the company is planning at the moment is a reduction in inventory, Farris said.

"If we're wrong, we may have a problem responding to the needs of our customers," he said. "Right now we have two operating plans.

"If the backlog continues, we'll stick to our present operation and, if the backlog falls off, we'll go to the other one," he said.

The present plan involves no cuts – in fact, the company is hiring in technical departments, sales and production, according to Capolla.

The objective is to put EM&M into a strong cash position. "Maintaining tight controls on inventory will be more important than the normal criteria for success," Farris said, because cash is in short supply and is very expensive.

"The cost of cash is 15% to 16%," Farris estimated, "when you consider the points and paying on the compensating balance."

Computer use will not decline, Capolla predicted, despite increasing costs resulting from inflation and shortages.

"In growth times it's easy to manage," he said. "Most managers have never managed in times like this. In tough times you need much tighter control – more statistics, therefore more computing," he said.

"On-line applications are expanding, not declining, and that means more disks and other peripherals," he said, "and maybe more business for the companies who can get the job done for less."

EM&M's OEM and end-user divisions are separate although their media manufacturing plant serves both.

The shortage of money is going to make people willing to pay higher monthly rates rather than buying, Farris predicted, adding banks will be willing to pick up those fully paid out leases.

But Stop Free Maintenance

Japanese Mainframers Hold Prices Firm

TOKYO – Japanese mainframe makers, while holding their equipment prices firm in the face of price hikes by foreign firms, have discontinued free maintenance and discounts, according to *EDP Japan Report.*

After firms backed by foreign capital, such as IBM, Univac Japan and Control Data Corp., raised their prices, Japanese firms held theirs stable, although they did try to negotiate increases with the Japan Electronic Computer Corp. (JECC), a collective set up to facilitate marketing.

Under the terms of agreement with JECC, mainframe makers sell their products to JECC, which leases them to end users. The makers were unable to negotiate price increases with JECC, and any price hikes payable by the end user would be pocketed by JECC instead of by the manufacturer, the newsletter said.

As a result, firms are ceasing to provide "excessive services" that resulted from intense competition in the market, the report said.

Although talks are planned next spring with JECC, *EDP Japan Report* indicated that by that time makers will be intent on marketing their new series of computers designed ostensibly to compete with products on the market as a result of the forthcoming import liberalization.

Rental hikes for domestically made computers might never materialize, the report observed.

International News

Hitachi-Fujitsu Venture Releases First Systems

TOKYO – The technical tie-up between Hitachi, Ltd. and Fujitsu, Ltd., initiated in October, 1971 and fostered by the Japanese government, has resulted in the introduction of the first two models in a planned series of seven computers.

There will be four models of the M-Series or large to "super large-scale" computers and three V-Series medium-scale machines.

Production of the M-Series Model 3, or M-180, and the Model 4, or M-190, is scheduled for the second half of 1975.

The M-Series is designed to be competitive on international markets. The system was developed by the two companies by making their respective architectures conform with each other and unifying software and input and output interfaces, Hitachi said.

The M-180 and M-190 use high-speed MSI and LSI components, Hitachi said, and are designed to provide on-line data base communication capabilities and support conversational processing.

The M-180 has a main storage capacity of up to 8M bytes while the M-190 goes up to 16M bytes.

Storage is added in increments of 1M bytes.

Both units have up to 16 I/O channels per processor and can consist of either one or two processors. Throughput is said to be 16 Mbyte/sec with the M-180 and 20 Mbyte/sec with the M-190.

Tape drives with densities of 1,600- and 6,250 bit/in. will be available, Hitachi said. Line printers will handle either 1,500- or 2,000 line/min.

The control programs for both systems include basic control, remote batch control and on-line real-time control. The M-180 also includes virtual storage management, while the M-190 offers multiprocessing control, multi-virtual storage control and TSS control, Hitachi said.

Hitachi is at New Marunouchi Building, 5-1, 1-chome, Marunouchi, Chiyoda-ku, Tokyo 100.

Chinese Calculator Comes Fully Equipped

CW West Coast Bureau

LOS ANGELES – An electronic desk calculator described as a complete, independent, small computer system has been trial-produced this year in the Peoples' Republic of China.

Called The Great Wall 203, it is said to be 2.5 times as fast as similar calculators produced outside China, according to *China Reconstructs,* published by the China Welfare Institute.

It is equipped with a printer and magnetic tape unit and uses integrated circuits.

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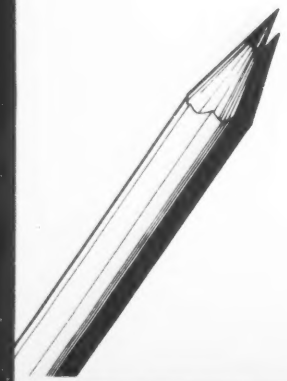

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CIRCULATION DEPARTMENT

Data 100 Centralizes Marketing Effort

MINNEAPOLIS – Data 100 Corp. has realigned its marketing and production management and created a centralized marketing organization, Data 100 Marketing Co.

The move will bring both OEM and end-user sales into one unit. Previously OEM sales were handled separately.

David J. Ekberg, vice-president of marketing, will assume the additional title of president of Data 100 Marketing Co.

Thomas G. Herschbach, a group vice-president, is responsible for all domestic operating subsidiaries, including Royal Industries Division, Data 100 Division in Westbury, N.Y. and California Data Processors in Santa Ana, Calif.

Theodore A. Johnson has been named president and chief executive officer of California Data Processors. He was formerly general manager of Data 100's communications systems division.

Decision Data Expands Operation

HORSHAM, Pa. – Decision Data Computer Corp., maker of card equipment, has revamped its North American marketing operations to accommodate increased sales and support activities.

The new structure is designed to permit more effective control of field operations and provide better service to customers at the local level, said Frank H. McPherson, vice-president of marketing.

The firm's North American marketing operation now consists of 55 sales locations with over 250 personnel reporting to 14 district offices and four regional directors.

Executive Corner

- Itel Corp. has promoted Joe D. Foster to president of Itel International, headquartered in London.
- Richard Decaire has been named vice-president of finance and administration for Martin Marietta Data Systems.
- Fred A. Ordemann has been appointed general manager of Control Data Corp.'s Memory Development Division.
- Vincent A. Pennisi has been named divisional vice-president at On-Line Systems, Inc.
- John H. Clark and Dan Ellis-ton have been named presidents of Itel Corp. Data Products Group's Computer Product Division and Lease Marketing Division, respectively.
- Clifton W. Sink has been appointed vice-president of marketing and elected a director at Entrex, Inc.
- Edward Marinaro has been named head of marketing for Modular Computer Systems, Inc.
- Joel Novak has been elected vice-president of engineering at Computer Devices, Inc.
- Bowne Time Sharing, Inc. has appointed Dale G. Ries president and David T. Herr vice-president. William B. Mahoney was elected to the company's board of directors.
- Peter Weill has been named president of International Computers (U.S.A.) Ltd.
- Software Module Marketing has appointed Harris A. Herman as president.
- Advanced Memory Systems, Inc. has appointed Dr. James A. Cunningham as vice-president of semiconductor operations.
- Raymond J. Endlich and John T. Valentino have been promoted to vice-presidents of Sorbus, Inc.
- John W. Bremer has been named director of advanced technology programs for Honeywell Information Systems.
- Henry S. Stover has been appointed Prime Computer, Inc.'s vice-president of marketing.
- James E. Ball has been appointed vice-president and director of On-Line Systems, Inc.'s Operations Division.
- James Gafke has been promoted to vice-president of sales for Itel Corp.'s Computer Products Division.
- Memorex Corp. has named James Simpson vice-president and general manager of operations in Liege, Belgium.
- MRI Systems Corp. has named Samuel T. Byars vice-president of technical services.
- Brian W. Pollard has been appointed vice-president of engineering for GTE Information Systems.

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We've selected leading experts from around the country to give seminars on some of the most important topics on today's EDP scene. These seminars are current, practically oriented, and packed with detailed information. They will help you save time and money. And they can give you the information you need to increase your installation's efficiency. In an increasingly complex and fast-changing EDP world, these seminars are even more important to your company, your installation, and you. Here is our current seminar schedule:

Data Communications

Includes SDLC, HID-LoD, and other topics that weren't even heard of a year ago.

Data Communications is a complicated and rapidly changing field. And this seminar will give you the information you need to keep on top of the subject. Led by the nationally recognized teleprocessing consultant, Dr. Dixon Doll, the course covers recent changes in areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of satellite carriers and specialized carriers.

The course will also cover general data communications topics, including intelligent terminals (performance and selection criteria), network software handlers (e.g. CICS) and network organization and design. And, you'll learn about saving money using such innovative concepts as split-stream modems, remote-multiplexers/concentrators, diagnostics for fault isolation and front-end processors.

All participants in this seminar will receive a 2-volume loose-leaf outline of all course materials (prepared by ICC Institute), a copy of "Data Modems Selection and Evaluation Guide" by Vess V. Vilips and a "Data Communications and Teleprocessing Dictionary".

You should attend this seminar if you are currently involved in data communications on a management or operational level and wish to expand your knowledge of the field – or if your company will be going into this area in the near future.

This seminar runs two days, and total cost, including workbook, reference materials, luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule is as follows:

Los Angeles	Los Angeles Marriott (Airport)	January 13 - 14

Data Base Management

A practical approach to the design and implementation of data base systems.

The difference between an effective data base system and a waste of computer time and memory lies in effective planning, system selection and management. And this course gives you both the information and the basic experience you need for the proper design and implementation of a data base system.

Given in association with Leo J. Cohen and Performance Development Corporation, this course covers a comprehensive list of topics, including:

- *the description and definition of the Data Base System Project.*
- *the development of a full-service analysis and system design.*
- *optimum file organization and indexing techniques.*
- *all available indexing techniques and their implementation.*
- *all aspects of system management.* • *and much more.*

One of the key features of this course is the workshops, in which you'll apply what you've learned. And before you're finished you'll have "done" a complete, on-line order entry / inventory management system.

You should attend this seminar if you are (or will be) involved in the design and implementation of a data base system – whether as a DP Manager, Data Base Administrator, Planner, Analyst or Programmer.

This course runs for 3 days, and costs $350, including course materials, continental breakfasts and luncheons. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule:

Boston	Sheraton Boston Hotel	February 10-12
Los Angeles	Los Angeles Marriott	March 3-5
Chicago	Sheraton O'Hare Motor Hotel	May 12-14
New York	The Plaza	June 2-4

Contracting for Computers and EDP Support Services

A seminar that can help you protect your EDP investment – and your system.

In an industry that's famous for its "promise them anything" attitude, you need good, effective contracts from the vendors that supply your installation. And this seminar gives you the information you need to get them. It will show you how to protect your installation from late deliveries, inadequate equipment or services and the costly disruptions that they can cause.

Course topics include the lease and purchase of computer systems, separate hardware and software – the purchase of time sharing, data processing services and consultation – and the use of facilities management.

Under the personal instruction of Roy N. Freed, a nationally known lawyer, author and expert in the field of computer law, you'll learn how to place yourself in a strong bargaining position, how to insure on-time delivery of exactly what you want, how to set reasonable performance standards for warranties – and much more. You'll also receive a complete resource notebook, *including sample vendor contract forms.*

You should attend this seminar if you are involved in the purchase of EDP equipment or services, whether as a corporate counsel, contract administrator, DP manager, consultant or officer of a using firm.

Cost for the entire 2½ day seminar, including complete resource notebook, continental breakfasts, luncheons and coffee breaks is $295.00. The current schedule:

Los Angeles	Los Angeles Marriott	January 15-17
Chicago	Hyatt Regency O'Hare	February 26-28
Atlanta	Stouffers Atlanta Inn	April 23-25
New York	St. Moritz	June 4-6

Operating Systems and Virtual Storage

A seminar on more efficient operation of your computer system.

Large installations now expect many programs to run simultaneously *and* efficiently. And that's what this 2½-day seminar is all about. Under the leadership of Dr. Ivan Flores, author of 14 books and one of the world's most prolific writers on systems software, you'll gain an excellent technical knowledge of your operating system, OS and VOS. The course uses the IBM/370 as its subject computer, because of its popularity, and includes these topics:

- Overview of Operating Systems
- Hardware aspects of Operating Systems
- Job Management
- Task Management
- Data Management
- Virtual System Philosophy
- Virtual Hardware
- Virtual Storage Operating Systems

Everyone involved with operating systems can benefit from this seminar. Programmers can employ its lesser known features. The manager can choose an operating system and options to handle *his* installation more efficiently. The chief operator can understand what's happening and better manipulate the system. The executive can determine the requirements for his plant.

Cost for the entire seminar, including course materials, luncheons and continental breakfasts is only $295. Current schedule: New York February 3-5
St. Moritz Hotel

THE EDP SEMINAR SERIES sponsored by COMPUTERWORLD

Key-to-Storage Systems

How to evaluate and optimize the various successors to keypunch equipment.

Data entry is a big problem – and a big headache – as every computer user knows. It is therefore a prime target for cost savings. This course is designed to help you in the practical aspects of selecting, installing, and making the best use of keyboard-to-storage systems. It is an expansion and an update of our successful key-disk seminar. Under discussion (including some user case studies) will be:

- Introduction to data entry concepts (keypunch, buffered keypunch, keypunch, key-disk and beyond . . .)
- Key-disk hardware and software
- Evaluating . . . and starting . . . key-disk systems
- Selecting and operating intelligent terminals, both key-to-cassette and key-to-floppy disk
- Key-disk as a remote batch terminal
- Supervisor functions; motivation
- Mixed Media systems
- Trends in Computer Data Entry

This seminar is lead by Lawrence Feidelman, President of Management Information Corporation, and one of America's leading experts on data entry. All participants will receive a copy of "Data Entry Today", Management Information Corporation's authoritative publication on every aspect of data entry, including a six-month update of this continuing reference service.

You should attend this seminar if you are concerned with optimization of your data entry shop, and especially if you are considering or currently using key-to-storage systems more advanced than basic keypunch. Cost for the 3-day seminar is $350, including continental breakfasts, luncheons, and all course materials. Additional registrants from the same company are charged only $300.

Los Angeles	Sheraton Inn (Airport)	February 3-5
New York	Waldorf Astoria	April 21-23
Chicago	Hyatt Regency O'Hare	June 9-11

To: Ed Bride, Vice President, Editorial Services, Computerworld
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CLA Chastises GSA For Short Bid Time

WASHINGTON, D.C. – Although the General Services Administration (GSA) is required to give vendors advance notice of a government DP procurement, sometimes that notice is too brief, according to Jim Benton, executive director of the Computer Lessors Association (CLA).

GSA recently sent out a solicitation for bids on an IBM 370/165 for the Army's Management Systems Support Agency (MSSA), which required proposals within five working days and delivery of the system within 15 working days after the notice was received.

In a letter to GSA's administrator, Arthur F. Sampson, Benton protested that "this solicitation may technically fulfill the requirements the GSA has prescribed for competitive procurement, however from a practical point of view it appears to be an attempt to avoid a truly competitive situation.

"And further, requiring that it be delivered in 15 days makes meeting the requirement virtually impossible unless the equipment is already sitting unused in a warehouse, and that's not likely."

In a reply letter, Larry F. Roush, acting assistant administrator for the GSA, acknowledged the elapsed time was a short bid period for this type of solicitation and said it did not represent GSA's normal practice.

"We generally allow a minimum of two weeks for proposal submittal in cases such as these . . . ," he said.

The GSA sought an expedited solution in this case to "provide the Department of the Army with emergency computer capacity since they lost their right to use another agency's system for their processing. No award was made . . . for this solicitation since equipment available from the government's inventory . . . provided a less expensive alternative," Roush said.

Orders & Installations

American Express Co. has ordered for lease four Trace systems valued at $4.1 million from Recognition Equipment, Inc. (REI). REI is also installing the second two transports of an initial Trace order at First National City Bank in New York.

The Republic National Bank of Dallas has ordered 53 Sycor Model 340 intelligent terminals for use in its multibank data processing network.

A Univac 90/30 computer system has been ordered by Southwest Information Management Systems.

Four Shoprite supermarkets in New Jersey have ordered NCR 255 checkout systems valued in excess of $250,000.

Albertson's, Inc. has ordered 16 Datachecker electronic supermarket checkout systems from National Semiconductor Corp., priced at approximately $1 million.

Bridgton Distributors, Inc. has ordered a Univac 90/30 to produce instant cash sale invoices via terminals at sales counters in four of its stores. The system will also handle payroll and accounts payable.

CACI, Inc. has been awarded a contract by the General Services Administration to implement the Simscript II.5 simulation and programming language compiler for the U.S. Army. The compiler will be used for simulation model development on government Univac 1108/1110 systems.

First National Stores, Inc. will install an automatic scanning checkout system from NCR early next year in its Brighton, Mass., store. The food chain also ordered five additional nonscanning store systems using NCR 255 electronic checkout terminals and 726 in-store minicomputers.

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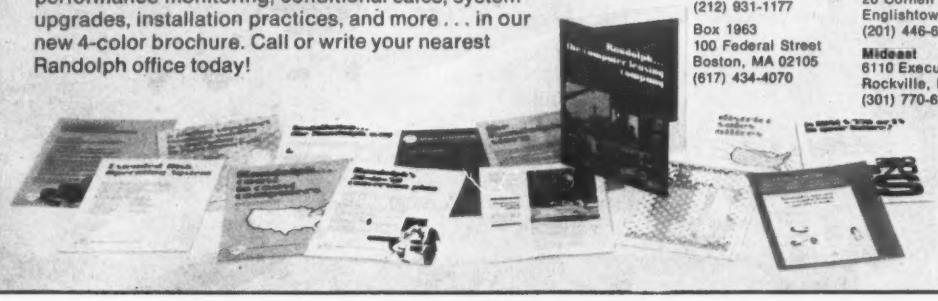

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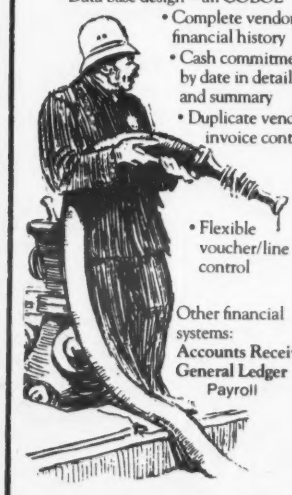

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Wyly Loss Cut to $650,000 In Period

DALLAS – Wyly Corp., which is comprised of University Computing Co. (UCC), Gulf Insurance Co., Data Transmission Co. (Datran) and Computer Leasing Co., managed to reduce its losses for the nine months to $650,000 or 8 cents a share from a loss of $6.4 million or 77 cents a share in the year-ago period.

Revenues for the nine months increased to $157.4 million compared with $150.8 million in the year-ago period.

The balance sheet showed some sizable write-offs and counterbalancing credits.

There was a $10 million write-down in the third quarter on the value of computer equipment held for lease, as well as a $4.1 million insurance underwriting loss. The firm expects to fully depreciate its computer equipment by the end of 1978.

But a $12.9 million gain to UCC from termination of a computer services contract with LTV Aerospace nearly offset the previously mentioned charges.

However, the firm may expense previously capitalized preoperating and development costs of the Datran network at the end of the year if the proposed new accounting principle [CW, Oct. 30] is adopted by the accounting profession, the firm said.

If the principle had been applied at the end of the third quarter, the effect would have been to increase the loss for the nine months by $10.1 million, Wyly said.

In the third quarter, Wyly lost $1.6 million or 19 cents a share compared with a loss of $7.2 million or 86 cents a share in the year-ago period, when there was a charge of $6.4 million.

Quarterly revenues rose to $53.4 million from $50.3 million in the year-ago period.

Broken down by division, during the quarter UCC contributed income before taxes and unallocated corporate costs of $14.5 million, including the $12.9 million gain from the cancelled contract, compared with $378,000 last year.

The insurance unit showed a loss of $2 million compared with a loss of $546,000 last year, while Computer Leasing lost $10 million compared with income of $76,000 in the same year-ago period.

For the nine months, UCC contributed income of $19.2 million compared with $2.5 million last year. Gulf Insurance lost $80,000 compared with income of $4.2 million in the 1973 period while Computer Leasing's figures were the same as for the quarter.

UCC President Donald G. Thompson attributed UCC's progress to continued emphasis on marketing the company's products to a narrow field of specialized industries and the consolidation of people and equipment.

UCC's pretax nine-month earnings rose to $6.2 million from $2.5 million in the year-ago period. This includes $1.3 million from operations of the UCC Aerospace Division, assets of which were sold to LTV for the $12.9 million credit.

SEL Revenues Rise

FORT LAUDERDALE, Fla. – Minimaker Systems Engineering Laboratories, Inc. (SEL) managed to cut its first quarter losses to $109,000 or 4 cents a share compared with $778,000 or 30 cents a share in the year-ago period.

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Earnings Reports

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Three Months Ended Sept. 30

	1974	1973
Shr Ernd	$.19	$.28
Revenue	1,892,228	1,878,793
Earnings	131,995	192,766

CALIFORNIA COMPUTER PRODUCTS
Three Months Ended Sept. 30

	1974	1973
aShr Ernd	$.24	$.39
Revenue	32,873,000	25,683,000
Tax Cred	.....	537,000
Earnings	781,000	1,252,000

a-Fully diluted.

COMPUTAX SERVICES
Year Ended Sept. 30

	1974	1973
Shr Ernd	$.41	$.60
Revenue	19,321,758	17,360,792
Earnings	513,628	755,602

COMSAT
Three Months Ended Sept. 30

	1974	1973
Shr Ernd	$1.16	$.98
Revenue	34,220,000	30,747,000
Earnings	11,588,000	9,832,000
9 Mo Shr	3.26	2.51
Revenue	97,542,000	86,649,000
Earnings	32,601,000	25,055,000

METRIDATA COMPUTING
Three Months Ended Sept. 30

	1974	1973
Shr Ernd	$.20	$(.10)
Revenue	1,232,000	1,291,000
Tax Cred	32,000	.....
Earnings	73,000	(38,000)
9 Mo Shr	.51	(.04)
Revenue	3,609,000	2,589,000
Tax Cred	88,000	.....
Earnings	189,000	(16,000)

COMPUCORP
Three Months Ended Sept. 30

	1974	a1973
Shr Ernd	.....	$.53
Revenue	$6,238,000	8,169,000
Tax Cred	.....	361,000
Earnings	b(3,502,000)	900,000
9 Mo Shr	.....	$1.28
Revenue	19,210,000	21,055,000
Tax Cred	.....	869,000
Earnings	(3,997,000)	2,166,000

a-Restated to reflect accounting change. b-Includes unusual charge from write-offs of obsolete inventories and overstock conditions, and potential losses on disposition and realization of certain other assets.

DATA GENERAL
Year Ended Sept. 28

	1974	1973
Shr Ernd	$1.22	$.83
Revenue	83,196,000	53,306,000
Earnings	9,895,000	6,741,000

HAZELTINE
Three Months Ended Sept. 30

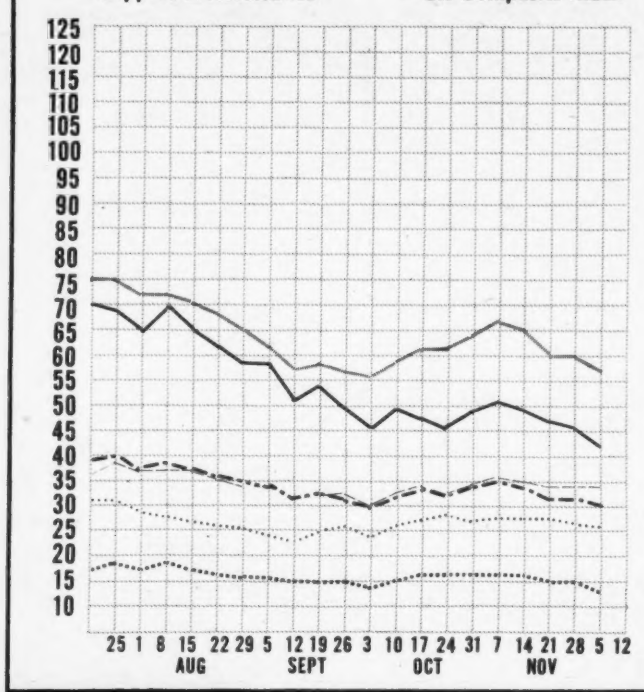
	1974	1973
Shr Ernd	$.07	$.31
Revenue	20,193,000	17,944,000
Tax Cred	.....	104,000
Earnings	140,000	593,000
9 Mo Shr	.28	.77
Revenue	70,925,000	54,750,000
Tax Cred	.....	509,000
Earnings	546,000	1,502,000

DOCUTEL
Three Months Ended Sept. 30

	1974	a1973
Shr Ernd	$.10	b$.39
Revenue	7,159,000	7,616,000
Disc Op	.....	(480,000)
Tax Cred	.....	398,000
Earnings	248,000	1,008,000
9 Mo Shr	.....	2.19
Revenue	18,889,000	23,677,000
Disc Op	.....	(566,000)
Tax Cred	.....	2,602,000
Earnings	(935,000)	5,562,000

a-Restated. b-Fully diluted.

COMPUTERWORLD Computer Stocks Trading Indexes



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TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		1974 RANGE (1)	CLOSE DEC 5 1974	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	63-217	73 3/4	-8 5/8	-10.4
O	COMPUTER AUTOMATION	2- 14	2 1/4	- 3/4	-25.0
N	CONTROL DATA CORP	10- 38	10 1/8	-2 3/8	-19.0
N	DATA GENERAL CORP	13- 38	14 3/4	-1 3/4	-10.6
O	DATAPOINT CORP	5- 15	5 1/4	-1 1/4	-19.2
O	DIGITAL COMP CONTROL	2- 5	1 3/4	- 1/8	-6.6
N	DIGITAL EQUIPMENT	51-121	54 7/8	-4 5/8	-7.7
N	ELECTRONIC ASSOC.	1- 3	1 1/4	- 3/8	-23.0
A	ELECTRONIC ENGINEER.	5- 11	4 3/4	- 1/8	-2.5
N	FOXBORO	19- 48	25 5/8	-3 3/4	-12.7
O	GENERAL AUTOMATION	7- 40	7	-1 3/4	-20.0
O	GRI COMPUTER CORP	1- 2	1/8	0	0.0
N	HEWLETT-PACKARD CO	54- 90	55 1/8	-3	-5.1
N	HONEYWELL INC	19- 86	18 5/8	-1 3/4	-8.5
N	IBM	152-251	166 1/4	-12	-6.7
O	INTERDATA INC	8- 22	13 1/4	0	0.0
O	MICRODATA CORP	2- 5	1 1/2	- 1/4	-14.2
N	NCR	14- 40	14 1/4	-2 5/8	-15.5
N	RAYTHEON CO	21- 39	22 7/8	-3 1/8	-12.0
N	SINGER CO	10- 40	10 1/4	-2 1/8	-17.1
N	SPERRY RAND	24- 44	25 3/4	-2 1/4	-8.0
A	SYSTEMS ENG. LABS	1- 3	1 1/8	- 1/8	-10.0
N	TEXAS INSTRUMENTS	60-115	67 7/8	-6 1/8	-8.2
O	ULTIMACC SYSTEMS INC	1- 2	3/4	- 1/8	-14.2
N	VARIAN ASSOCIATES	6- 13	6 1/2	- 1/2	-7.1
N	WANG LABS.	7- 20	7 3/8	- 7/8	-10.6
N	XEROX CORP	56-127	55 5/8	-4 1/8	-6.9
	LEASING COMPANIES				
O	BRESNAHAN COMP.	2- 2	2 1/8	0	0.0
O	COMDISCO INC	1- 7	7/8	- 1/8	-12.5
A	COMMERCE GROUP CORP	3- 6	2 5/8	- 1/8	-4.5
O	COMPUTER EXCHANGE	1- 1	1/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 4	1/2	0	0.0
O	COMP. INSTALLATIONS	1- 1	1/4	0	0.0
M	DATRONIC RENTAL	1- 1	5/8	-1/8	-16.6
A	DCL INC	1- 1	1/4	+	+25.1
N	DPF INC	2- 5	2 5/8	- 1/8	-4.5
O	EDP RESOURCES	2- 3	3 1/4	0	0.0
A	GRANITE MGT	1- 3	1	- 1/8	-11.1
A	GREYHOUND COMPUTER	2- 6	2 1/4	0	0.0
A	ITEL	3- 6	3 1/2	- 1/4	-6.6
N	LEASCO CORP	5- 12	6 1/8	- 5/8	-9.2
O	LEASPAC CORP	1- 2	1/2	- 1/8	-20.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	1- 5	1 1/2	- 1/4	-14.2
A	PIONEER TEX CORP	2- 10	2 1/8	- 3/8	-15.0
A	ROCKWOOD COMPUTER	1- 1	3/8	- 1/8	-25.0
N	U.S. LEASING	5- 24	8 3/4	-1 1/2	-14.6
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	5/8	0	0.0
A	APPLIED DATA RES.	1- 3	1	0	0.0
O	APPLIED LOGIC	1- 1	1/8	0	0.0
N	AUTOMATIC DATA PROC	21- 57	29 1/2	-4 1/8	-12.2
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	4- 6	3	0	0.0
O	COMPUTER DIMENSIONS	1- 3	1 3/4	0	0.0
O	COMPUTER HORIZONS	1- 5	1 1/4	0	0.0
O	COMPUTER NETWORK	1- 2	1/2	0	0.0
N	COMPUTER SCIENCES	2- 4	2	- 1/4	-11.1
O	COMPUTER TASK GROUP	1- 1	3/8	0	0.0
O	COMPUTER TECHNOLOGY	1- 1	1/2	0	0.0
O	COMPUTER USAGE	2- 4	2	0	0.0
O	COMRESS	1- 1	1/4	0	0.0
O	COMSHARE	2- 4	3 5/8	- 1/8	-3.3
N	CORDURA CORP	1- 4	1	- 1/8	-11.1
O	DATATAB	1- 3	7/8	- 1/8	-12.5
A	ELECT COMP PROG	1- 1	1/4	0	0.0
N	ELECTRONIC DATA SYS.	11- 25	12 1/4	-2 1/8	-14.7
O	INFONATIONAL INC	1- 2	3/8	+ 1/8	+50.0
O	I.O.A. DATA CORP	1- 1	1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 1	1/2	0	0.0
O	KEANE ASSOCIATES	2- 4	1 3/4	0	0.0
O	KEYDATA CORP	1- 6	2	0	0.0
O	LOGICON	2- 5	2 5/8	+ 1/8	+5.0
A	MANAGEMENT DATA	1- 2	1 1/4	0	0.0
O	NATIONAL CSS INC	6- 37	6	- 1/2	-7.6
O	NATIONAL COMPUTER CO	1- 1	1/4	0	0.0
A	ON LINE SYSTEMS INC	17- 30	14 3/8	-2 5/8	-15.4
N	PLANNING RESEARCH	2- 3	2 1/8	0	0.0
O	PROGRAMMING & SYS	1- 1	1/2	0	0.0
O	RAPIDATA INC	1- 5	1 3/4	0	0.0
O	SCIENTIFIC COMPUTERS	1- 1	1	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1/2	- 1/8	-20.0
O	TCC INC	1- 1	1/8	0	0.0
O	TYMSHARE INC	6- 12	5 7/8	- 7/8	-12.9
O	UNITED DATA CENTER	2- 4	2 1/2	- 1/4	-9.0
A	URS SYSTEMS	2- 4	1 7/8	0	0.0
N	WYLY CORP	2- 5	1 3/4	- 1/4	-12.5
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	4- 11	3 1/2	- 3/8	-9.6
O	ADVANCED MEMORY SYS	1- 7	1 1/8	- 1/8	-10.0
N	AMPEX CORP	3- 5	2 7/8	- 3/8	-11.5
O	ANDERSON JACOBSON	2- 4	1 1/2	0	0.0
O	BEEHIVE MEDICAL ELEC	2- 7	1 3/4	- 3/4	-30.0
A	BOLT,BERANEK & NEW	5- 9	4 7/8	- 1/8	-2.5
N	BUNKER-RAMO	4- 8	4	- 1/4	-5.8
A	CALCOMP	4- 11	4	-1 1/4	-23.8
O	CAMBRIDGE MEMORIES	3- 16	2 5/8	-1 3/8	-34.3
O	CENTRONICS DATA COMP	7- 23	9 7/8	-1 3/8	-12.2
O	CODEX CORP	8- 16	15 1/4	+ 3/4	+5.1
O	COGNITRONICS	1- 2	3/8	0	0.0
O	COMPUTER COMMUN.	1- 2	3/8	- 1/8	-25.0
A	COMPUTER EQUIPMENT	1- 2	1 1/8	0	0.0
O	COMPUTER MACHINERY	1- 5	1 3/8	- 1/2	-26.6
O	COMPUTER TRANSCEIVER	1- 2	5/8	0	0.0
N	CONRAC CORP	10- 22	11 3/8	- 1/2	-4.2
O	DATA ACCESS SYSTEMS	2- 3	2 1/2	0	0.0
O	DATA 100	5- 13	4 3/4	- 7/8	-15.5
A	DATA PRODUCTS CORP	2- 4	2 3/8	- 1/4	-9.5
O	DATA RECOGNITION	1- 1	1/4	0	0.0
O	DATA TECHNOLOGY	2- 4	1 3/4	0	0.0
O	DECISION DATA COMPUT	3- 13	3	- 3/4	-20.0
O	DELTA DATA SYSTEMS	1- 2	1/2	- 1/8	-20.0
O	DI/AN CONTROLS	1- 2	1/2	0	0.0
N	ELECTRONIC M & M	1- 4	1 1/4	0	0.0
O	FABRI-TEK	1- 3	5/8	0	0.0
O	GENERAL COMPUTER SYS	1- 4	1 1/4	- 1/2	-28.5
N	GENERAL ELECTRIC	30- 55	34 5/8	-1 3/4	-4.8
N	HAZELTINE CORP	2- 7	2 3/8	- 1/8	-5.0
O	INFOREX INC	2- 5	1 1/2	- 3/8	-20.0
O	INFORMATION DISPLAYS	1- 1	1/8	0	0.0
O	INFORMATION INTL INC	6- 14	6	- 1/4	-4.0
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/8	0	0.0
N	MEMOREX	2- 5	2 1/4	- 1/8	-5.2
A	MILGO ELECTRONICS	6- 18	6 3/4	-1	-12.9
N	MOHAWK DATA SCI	1- 4	1 1/8	- 3/8	-25.0
O	ODEC COMPUTER SYST.	1- 3	3/4	- 1/2	-40.0
O	OPTICAL SCANNING	3- 6	2	0	0.0
O	PERTEC CORP	2- 6	1 3/4	- 1/8	-6.6
A	POTTER INSTRUMENT	1- 5	1 3/4	0	0.0
O	PRECISION INST.	1- 3	3/4	0	0.0
O	QUANTOR CORP	2- 8	2 3/4	+ 1/4	+10.0
O	RECOGNITION EQUIP	2- 5	1 3/4	- 3/8	-17.6
N	SANDERS ASSOCIATES	2- 8	2 1/4	- 1/4	-10.0
O	SCAN DATA	1- 2	5/8	- 1/8	-16.6
O	STORAGE TECHNOLOGY	6- 15	6	-1	-14.2
O	SYCOR INC	4- 13	4 1/4	-1	-19.0
O	TALLY CORP.	1- 4	1	- 1/8	-11.1
O	TEC INC	2- 7	1 3/4	- 1/2	-22.2
N	TEKTRONIX INC	20- 48	20 1/8	-1 1/4	-5.8
N	TELEX	3- 4	3 1/4	- 1/8	-3.7
O	WANGCO INC	3- 13	3 3/8	- 3/4	-18.1
O	WILTEK INC	1- 8	1	0	0.0
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 6	4 1/4	- 1/4	-5.5
A	BARRY WRIGHT	4- 7	4 1/4	- 1/4	-5.5
O	CYBERMATICS INC	1- 2	1/2	0	0.0
A	DATA DOCUMENTS	23- 54	29 5/8	-4 3/4	-13.8
O	DUPLEX PRODUCTS INC	6- 17	14 3/4	- 3/8	-2.4
N	ENNIS BUS. FORMS	4- 7	4 1/2	- 1/4	-5.2
O	GRAHAM MAGNETICS	6- 11	6 1/4	- 1/2	-7.4
O	GRAPHIC CONTROLS	6- 11	7 1/2	- 3/4	-9.0
N	3M COMPANY	46- 79	46	-6 1/8	-11.7
O	MOORE CORP LTD	33- 57	38 3/4	- 3/4	-1.8
N	NASHUA CORP	23- 45	22 1/2	-1	-4.2
O	REYNOLDS & REYNOLD	6- 35	6 1/2	-1 1/2	-18.7
O	STANDARD REGISTER	10- 16	11	- 3/4	-6.3
O	TAB PRODUCTS CO	5- 11	5	0	0.0
N	UARCO	13- 23	17 1/2	- 3/8	-2.0
A	WABASH MAGNETICS	3- 7	3	- 1/8	-4.0
N	WALLACE BUS FORMS	14- 24	14 3/4	- 3/4	-4.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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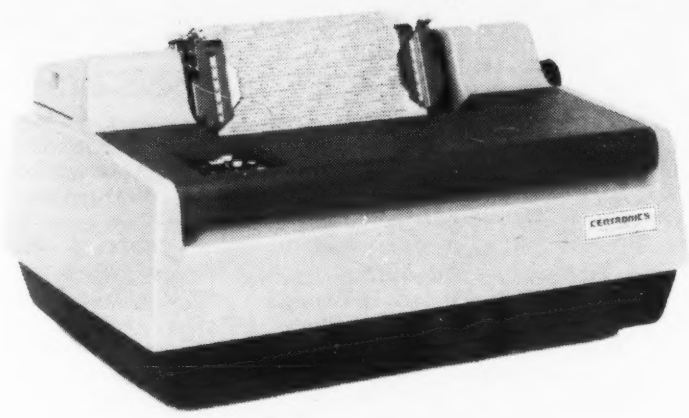
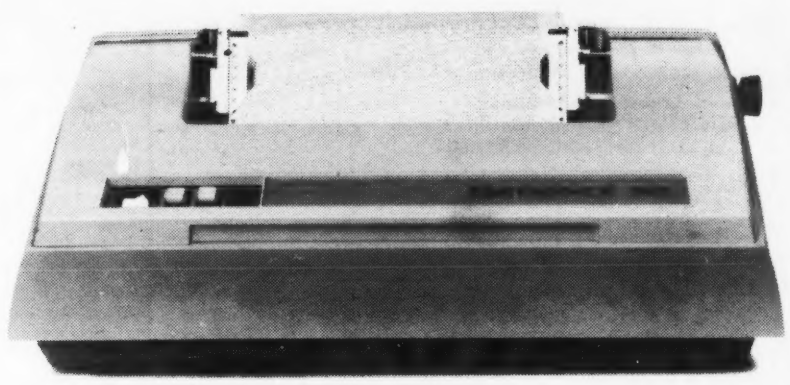
Centronics announces two new low-cost printers.

You never saw such performance for the price.



Our low-cost Model 301.
165 char/sec. 80 char/line.
70 to 175 lines/min.



Our low-cost Model 501.
165 char/sec. 132 char/line.
50 to 175 lines/min.

Our new, low-cost 301 and 501 are the fastest impact printers in their price range, for use anywhere hard-copy output is required.

The 80-column Model 301 is particularly suited for use as a receive-only communications terminal. And it's ideal for CRT hard-copy output.

Our Model 501—a 132-column printer—is an excellent, cost-saving choice for any application requiring medium-speed printing.

Both models operate at a fast paper slew rate, with multi-copy printing. Options include a wide range of computer interfaces and communications adapters, foreign character sets, and automatic motor control.

With the addition of these new printers to the popular Series 300 and 500 product lines, you now have a broader-than-ever choice of capabilities. And you also get the reliability you've come to expect from Centronics®. The 301 and 501 share the basic, field-proven, modular parts used throughout the Centronics line. Including our state-of-the-art, large-scale integrated circuitry (LSI) for enhanced reliability and simplified maintenance.

Get full particulars on these new, low-cost Centronics printers. Write or phone our nearest office.

About Centronics: Centronics offers you the broadest line of medium-speed printers anywhere. And provides you with optimum price/performance ratios. High-volume production assures prompt delivery. Service and parts are readily available through a network of field service offices. Look to Centronics for printers—and for reliability proven in tens of thousands of installations.

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Centronics International Corp.: Brussels, Belgium, 02-762-3572/3

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